

ISSN: 2392-5442 ESSN : 2602-540X		<i>Sport system journal</i>
V/09 N/01 Year/2022		<i>International scientific journal published by: Ziane Achour –Djelfa- Algeria</i>
P 234 - 249		<i>Received: 31/10/2021 A ccepted: 11/12/2021</i>

## **The importance of the cognitive symbolic representation in educational sports practice during the physical and sports education class**

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### **Abstract:**

This study, focuses on the importance of the cognitive symbolic representation in educational sports practice during the physical and sports education class. Considering the studies in this field (sciences and techniques of physical and sports activities with the both of cognitive and educational psychology) are not much available, especially which are linked with Mental processes during educational sports practice. Therefore we want to highlight the operation of the cognitive symbolic representation during the physical and sports education class.

We count on the descriptive method in this study, in order to achieve the research goals which is extracted by improving that the hypotheses are correct; the cognitive symbolic representation have a big importance in the educational sports practice during the physical and sports education class in addition, this importance is also exist on the other sides of learner (psychological sides and the technological ones ) not only the cognitive side.

**Keywords:** Cognitive Symbolic Representation Educational Sports practice; Physical and Sports Education class.

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## **1. INTRODUCTION**

Human knowledge is formed as a result of intellectual deposits acquired from life experiences in addition to the overlap of some genetic factors that are prevalent and prominent, in which the information stored inside the brain is translated, each in its own place, after it has undergone a symbolic-cognitive representation process.

The cognitive-symbolic representation process centers on extracting information from sensory experiences and joining them to what is stored in memory, as each individual represents environmental stimuli in a different way from others, and this causes some problems in the communication process, considering that what we see, smell, taste and represent in our memory is different from what others have, but the degree of similarity in our representation of the vocabulary of the environment is sufficient to help us coexist with each other. The subject of internal cognitive representation has received the attention of scientists and researchers in cognitive psychology, and is one of the prominent topics in this field.

The credit for acquiring certain skills - whatever their characteristics - is attributed to that property based on the principle of repetition, provided that in each sphere, it forms mental links created as a result of an adjustment, addition or decrease at the level of the cognitive record of the individual learner.

The study of the cognitive-kinesthetic aspect is the feature that represents the difference during educational sports practice as a prescribed subject in secondary education in Algeria, concerned with the physical and sports education class, in which the teacher is directed to the learner (according to the competency approach), putting him in a problem-setting situation that requires the individual to find Its solution is represented in manifold exercises (physical - technical - psychological - cognitive ..), These postures are a mental provocation of the learner's knowledge in order to try to get out of the educational problem with the most appropriate and safest solution suggested to him by his brain and implemented by his motor system. He passed through his previously acquired cognitive symbolic representations and stored in long-term memory and returned to him through his coding, representing and storing new knowledge acquired during the situation - a problem through the physical education and sports class.

From what was mentioned above, we decided to ask the following main question: What is the significance of the cognitive symbolic representation for educational sports practice during the physical education and sports class?

Hence, we asked the following partial question:

- Is the cognitive symbolic representation important only on the cognitive side of the learner during the physical education class?

## **2. Hypotheses :**

### **2.1 The general hypothesis:**

The cognitive symbolic representation is of great importance for educational sports practice during the physical education and sports class.

### **2.2 Partial hypothesis:**

The cognitive symbolic representation is important not only to the cognitive aspect of the learner during the physical education class.

## **3. Objectives of the study:**

Objectives are defined as “possible future stations, time-limited, that can be achieved, and then measured.”(محمد، 2014) Therefore, the objectives of this study are reflected in the following:

- ✓ Testing the validity of the proposed hypotheses.
- ✓ A theoretical briefing about the cognitive symbolic representation process and its importance in relation to educational sports practice.
- ✓ Strengthening the idea of actually integrating the field of cognitive psychology into the sports field of the educational environment.

## **4. Reasons for choosing the topic:**

### **4.1 Objective reasons:**

- Following the confirmation of many specialized professors on the importance of this field (cognitive psychology) in the sports field, which has become well known throughout the world and developed countries in particular.
- As a result of the availability of the various conditions necessary for the study (intellect-cognitive competence, a love for aspiration and scientific exploration, the availability of some references..).

### **4.2 Subjective reasons:**

- The tendency towards scientific-mental fields.
- Scientific zeal, to elevate this specialization to the farthest horizons, as is the case in most developed countries.

## **5. Previous studies :**

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➤ **Study of Ghada Abul-Majd Ahmed Muhammad:**(2021-2020 ، محمد غ.)

The doctoral thesis entitled "The effect of a program based on systemic thinking skills on the efficiency of information representation and the cognitive burden among a sample of students of the Faculty of Education at Minya University" was discussed under the supervision of Prof. Dr. Nagdi Wanis Habashi and Dr. Howaida Mohamed Saber.

The study presented by the student researcher aims to determine the impact of the training program based on systemic thinking skills on the efficiency of visual representation and verbal representation of complex dynamic systems among the experimental group students, and to determine the extent of the difference in the level of performance of the experimental group students on the tasks presented to them before applying the existing training program. On the skills of systemic thinking and after its application, together with calculating the educational efficiency of the training program in light of both the level of performance and the level of perceived mental effort associated with it among the students of the experimental group.

The student researcher applied a training program based on the experimental method, as she conducted the program on an experimental sample of (48) male and female students in the fourth year, who are enrolled in the Educational Psychology Division at the Faculty of Education at Minya University in the academic year 2019/2020.

➤ **A study of Metiwi Fatima Al-Zahra Iman and Dardoun Kenza:** (إيمان و دردون ، 2019)

The role of educational sports activities in alleviating shyness among adolescents in the stage of Average from 12 to 15 years, "A psychological, social and educational approach", a field study of some averages in the Wilayat of Sidi Bel Abbes.

The study aimed in the year 2016-2017 to know the role of educational sports activities in reducing the severity of shyness among middle school students, as well as knowing the role of educational sports activities in raising the degree of self-confidence among middle school students with knowledge of the role of educational sports activities in raising the degree of communication and social integration.

The study population reached about 90 middle school students, and the shyness scale was used. The results of the study indicate the validity of the

hypotheses put forward by the research group. It was found that the educational sports activities have a significant role in alleviating the feeling of shyness in adolescence.

## **6. Define concepts:**

**6.1 Cognitive symbolic representation:** All of the following authors define:

- Piaget (1963): that cognitive symbolic representation is the process of transformation of stimuli into patterns or behavioral patterns (Piaget, 1963, p70).
- Bruner (1973): The process by which an individual's cognitive systems or stimuli are modified according to a specific pattern. (Anderson & Bruner, 1973, p. 151)
- Veygotesky (1978): It is the artistic mental or intellectual performance that results in an implicit action based mainly on cognitive development. (Vygotsky, 1978, p. 22)
- Sternberg (1992): It is the extraction of information from sensory experiences, coding, organizing and joining them to what is stored in memory. (Sternberg, 1992, p. 89)
- Gargiulo (2006) defined the cognitive symbolic representation as: It is a recollection of information or things at the time the individual performs one or more other cognitive processes. When the individual remembers an address while listening to related instructions about information or numbers, he uses working memory skills and when The individual employs the skills of cognitive representation, as he performs the process of remembering along with other skills. (Gargiulo, 2006, p. 68)
- Al-Qaisi and Abdel-Khaleq (2012): A mental process that includes organizing, processing, encoding and coding stimuli so that they have a meaning that helps the individual to control and direct. (Al-Qaisi and Abdel-Khaleq, 2012, p. 7)

For the procedural definition: it is the mental process that the individual-learner performs during the physical and sports education class, which is called for to elicit stored and different information and knowledge according to what the situation imposes-a problem, represented by encrypted symbols in the individual's long-term memory.

## **6.2 Educational sports practice:**

Sports practice is defined as: the integrated part of the educational process, which enriches and harmonizes the physical, mental, social and

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emotional aspects of an individual's personality mainly through direct activity through the practice of physical activities. (2003، حسني)

- Class sports activity: It is activities given in the daily working hours of the school program, and therefore it is limited to the daily lesson and one of its objectives is to raise the physical abilities and motor skills of the students to the level that can be achieved by the program set within the framework of the general school plan.
- Extra-curricular sports activity: The goals and duties of physical education cannot be achieved through the classroom physical education lessons. Therefore, the importance of extracurricular activities in the school field has appeared in a positive way to achieve many educational goals. (السامرائي)

**procedural definition:** The educational sports practice here centers on those standardized sports activities of an educational nature, which are within or between the educational institution, and which fall under the subject of physical and sports education according to established goals and competencies, and the smallest unit of them is exercise or educational status. Where the teacher (professor) strives to prepare the latter in line with the desired goal.

### **6.3 Physical education and sports class:**

It is the small unit in the curriculum for physical and sports education. Through it, the student acquires physical fitness and learns various skills. It also allows him to learn several situations such as leadership, cooperation and honest competition. (2004، سعيد و نبيلي)

## **7. Theoretical background:**

### **7.1 The cognitive symbolic representation**

#### **7.1.1 The concept of cognitive symbolic representation:**

The process of symbolic representation of information is a mental process parallel to the processes of biological representation, as it is the integration of elements of new experiences into the system of the organic cognitive structure of the individual (for example, the process of food digestion or the photosynthesis process of plants). As in the case of biological representation, cognitive representation in mental life involves integrating new data with original internal cognitive structures.

7.1.2 **Theories of representation:**

➤ Dual-coding theory:

The binary coding theory is one of the most important theories of psychology related to human knowledge. It was developed by Alan Bivio in 1971 on the idea that the mental image of the individual helps in the process of learning and remembering, which gave impetus to the introduction of scientific illustrated materials into education, and this theory comes from the premise of coding in psychology, and the way humans relate symbols to things. This theory, developed by Pavio, weighs between non-verbal processing and verbal processing, and states that the unique human cognition has become specialized and able to deal at the same time with more than one language and with many non-verbal objects and events. Moreover, the human language system is somewhat strange because it deals with linguistic inputs and linguistic outputs in the form of speeches or different writings, and at the same time serves a symbolic function in relation to non-verbal events, things, and behaviors, and representational theories must accommodate this dual functionalism.

The theory also assumes that there are two systems or branches of perception, one of them is specialized in processing and representing non-verbal objects and events, which are symbols or images, and the other is specialized in dealing with language. This and the (logogens) of verbal entities that he describes as pieces-like, as described by Miller as well.

- Types of processors: The binary coding theory identified three types of processors, which are:
  - Representation: It is the direct interaction of non-verbal or verbal representations.
  - Reference: It is the activation of the non-verbal system before the verbal system or vice versa.
  - Associative processing: It is the activation of the representational system within the same non-verbal or verbal system.

The theory has been applied and used in many cognitive phenomena including mnemonics, learning, problem solving, concept learning, and language. Binary or double coding theory also calculates the importance of spatial abilities in theories of intelligence, for example, Guilford's theory. (حماد، 2021)

Bivio also points out that the process of encoding information and its

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representation by individuals depends to a large degree on the extent of the importance of the information and its representation by individuals and depends to a large degree on the extent of the importance of the information for the individual, as he sees that the information that seems more important to the individual is often encoded verbally and graphically, while information that does not seem to be of interest to him may be encoded according to a single system of coding.

One of the evidences that prove the validity of this theory is the evidence that came from the study of the cerebral hemispheres (right and left). This means that the shift from one coding system to another must be accompanied by a shift in activity from one section of the brain to another.

(نوري)

The coding process is one of the first main stages that memory adopts when storing and retrieving or (recalling) information. The second stage is the storage stage, or what is known as the stage of representation and concept formation, followed by the third stage, which is the stage of visualization and problem solving.

This process includes placing information in categories or organizing information in several meaningful ways if the information is (sound, sight, smell, or sensory feel... etc.) and this stage also includes establishing connections between new facts and what the individual knows from previous facts by linking the new information with the information stored in the brain, which later helps to retain the information.(2002، سامي)

### ➤ Osbel's theory:

Osbel has reached an epistemological theory on meaningful verbal learning, assuming that the concept or mental perception of an experience acquires a real psychological meaning if it is linked to the learner's cognitive store, and assumes that people learn by organizing new information in their recording system, so he calls general concepts by embedding, because other concepts involve Under it, it also assumes that the learner grows and progresses in a deductive manner from understanding general concepts to understanding more precise and specific ones.(1998، يوسف و قطامي)

### ➤ Piaget's theory:

Related to cognitive growth, as Piaget considered growth a connected revolutionary process of changes that reveal the potential of the individual.

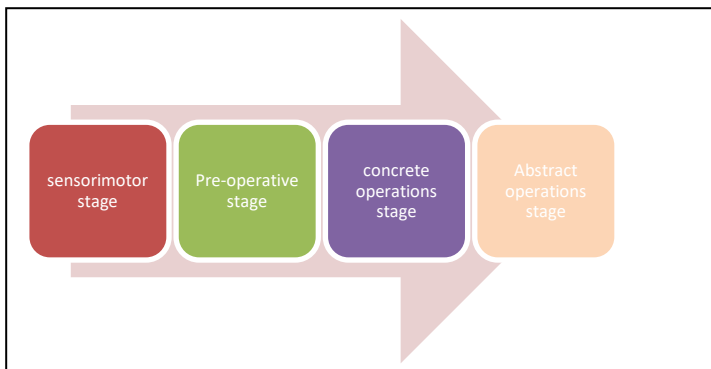


Jean Piaget focused on the importance of providing the child with different educational experiences that help him acquire different concepts during their childhood. He concluded that the child's cognitive development is the result of four main factors: (biological maturity, balance, social experiences with people, natural experiences with things).

Maturity is one of the most important factors that affect the way we understand the world around us, if the biological changes that an individual undergoes are inherited due to the genetic makeup at the moment of formation. As for equilibrium, it occurs when biological factors interact with the physical environment. The tendency of the individual to achieve equilibrium. The social experiences that as we grow we interact with others around us and thus this affects our cognitive development through learning from the experiences and behaviors of others.

Piaget followed the "clinical method" in psychological research in the world of childhood to track the development of children and their distinct characteristics in the context of the developmental process. And it works on his mental advancement, including the process of adapting to the environment on the one hand and the process of organizing experience on the other hand, and the process of adaptation in Piaget's view is built on two complementary pillars, which are the processes of "accommodation" (l'accomodation).(2009، الهادي)

**Fig.1.** Mental development according to Piaget



**Source:** Ismaili yamna abdelkader et kechouche saber, 2015, p279

- Vygotsky's theory:  
Cognitive development in children according to Vygotsky has two main aspects:

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- The biological physical aspect (inherited): the individual's biological capabilities and brain cells and the extent to which they absorb the amount of information.
- The environmental aspect (acquired): socialization, habits and interaction.

The theories of Piaget and Vygotsky fall under the current that focused on mental structures and among its components are Gestalt theories that this school gave great importance to mental processes in mental activity and made the view of mental life as systems and systems, with regard to Piaget's work, which was under the label 'Cognitive Psychology', works that have produced a robust and integrated theory about mental and cognitive development. As for Vygotsky, his achievement in the field of generative and transformational linguistics will benefit an important sector of mental activity, which is the sector of language. (العربي و ركزة، 2016، صفحة 25)

### **7.1.3 The importance of the cognitive symbolic representation:**

- ✓ The sensory information enters both the activating device (which is called the magnification device) and to the cortex (which is called the model information device). If the inputs match the previous information, a palm signal (A) is sent to the activating device. But if there is no match between the information entered and the information present, the activation device (B) is notified, which in turn activates the bark. (العربي و ركزة، 2016، صفحة 139)
- ✓ The process of interpretation and internal representations of the system during the interpretation of behavior is what the epistemological model focuses on, based on the works of J. J. Bruner 1956 a study of thinking and Chomsky (Noam Chomesky). It is about understanding the course of thought and the sequence of mental processes that lead to solving the problem. The attention here is directed primarily to the detection of mental strategies when people encounter an action. (محمد ب.، 2019، صفحة 19)
- ✓ Our mental states as cognitive phenomena that are supposed to be detectable and centralized represent something. They represent information or several information about the outside world and can be encoded either in a linguistic (manual digital) or graphical (standard) form. The transformations that affect the nervous states cannot be described through a physical chemical language only because these transformations are at the same time accounts about the representations and information

transmitted by these states. (محمد ب.، 2019، صفحة 18)

- ✓ Levin believes that learning is a dynamic process that occurs during the process of continuous interaction between the learner and the educational situation, including its various influences. (عبدالقادر و قشوش، 2015)

## **7.2 Educational sports practice:**

### **7.2.1 The concept of educational sports practice:**

Sports practice within the educational environment is considered one of the practices that are taken into account and included in the Algerian curricula, especially in the intermediate and secondary stages, because of their important role in achieving the comprehensive development of the individual, under the context of what is known as physical and sports education, which The nature of sports practice in it is limited to sports practice (classroom activities within the institution) and other extra-curricular activities that take place between educational institutions, both of which are of an educational nature.

### **7.2.2 The importance of educational sports practice:**

Hizam Muhammad Reda Al-Qazzouni believes that there are certain points that an individual learns while practicing sports activities, including:

- Acquisition of values: the acquisition of information and experiences through the practice of educational sports in particular, contributes to the acquisition of the learner with a set of values - according to the objective of the situation - a problem - proposed by the teacher, and its example in social values is the relay race in individual activity, which He makes every learner bear his responsibility and therefore he will do his best to win with his team.
- Learn new skills and behaviors.
- Boost memory : As it has an effective impact on memory, for example, when the learner participates in acting roles according to educational situations, memorizing the role greatly helps to strengthen memory, as much of the information that is repeated during the speech finds a place in the brain's stores and the information is retrieved from its stores in the brain When needed when the acting role is completed and during the normal course of life.
- Organized and continuous sports practice of aspects of physical activity,

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and in a sound manner that helps: (psychological adaptation, self-realization of its practitioners, creating different situations that satisfy the needs for appreciation, success, self-realization and safety - according to Maslow's hierarchy of needs).

- It brings happiness and pleasure to the soul as it helps to get rid of tension and nervous exhaustion by unloading pent-up emotions.(2008، ميادة)

Yassin Ramadan also adds the following regarding the importance of educational sports practice:

- Exhaustion of excess energy
- Contributes to the balanced psychological development of the learner
- It gives the individual the ability to appreciate and distinguish behavior
- It helps to discover aspects of progress, backwardness, or deviation in any stage of development and to take positive steps for that.
- Educational sports practice plays an important role in making the practitioner emotionally balanced and able to adapt with others in various different areas of life.(2008، رمضان)

Arar Khaled Hosni also adds about the importance of sports practice:

- Providing a state of satisfaction and psychological satisfaction.
- It increases the individual's awareness of himself, as he realizes his abilities, capabilities and limits, and works on developing and developing them.
- Increases psychological confidence resulting from knowing the potential of the body.
- The educational sports practice, specifically for group activities, has an important role to achieve social interaction and overcome introversion and isolation, as the learner becomes more able to adapt and accept social life.
- Reducing the severity of behavioral problems that students-learners may face.(2003، حسني)

### **8. Analysis of the results :**

The answer to the general hypothesis: The cognitive symbolic representation is of great importance in the educational sports practice during the physical education and sports class.

Suffice it to say, the integration of cognitive sciences, specifically

educational sports practice and mental processes in their various subtleties, is one of the knowledge in which studies are still unborn and in need of in-depth research by researchers.

Despite the interest of the physical education subject - according to the course - in the educational stages (secondary and intermediate) in the cognitive aspect of the learner, along with the various psychological and physical aspects, but this needs to activate more of this aspect.

During the physical and sports education class, the learner acquires new concepts and knowledge, and may return to recover his gains encoded in his various memories in order to achieve the actual link between new and tribal knowledge, which is what Piaget referred to by the processes of assimilation and adaptation (discussed in the theoretical background of this study). .

Answer to the partial hypothesis: The cognitive symbolic representation is important not only to the cognitive aspect of the learner during the physical education class.

There is no doubt that the acquisition of knowledge requires the occurrence of several mental processes, on top of which is the process of encoding the knowledge or information obtained in order to preserve it in the practical or long-term memory, and since the subject of physical education, as mentioned in Sanfa, is concerned with the development of the psychological and physical aspect. And cognitive for the learner, according to what is contained in the course of the subject, the symbolic representation of knowledge is also important for both the psychological and physical aspects during the physical education class.

As for the physical aspect, this importance lies in encoding skill information related to a sports technique, such as how to dribble in basketball for a team sport, or how to run for an individual sport.

Considering that the symbolic representation process is one of the continuous and continuous processes during the cognitive-learning process in order to encode the information coming from the external environment (the educational environment, the teacher, colleagues...) or the internal environment of the learner's self (its mental ties in itself: that is, the acquisition of new knowledge based on based on previous knowledge (through self-learning, the symbolic representation necessarily has an importance as well on the psychological side, as this process leaves an echo that benefits the psyche of the learner and achieves what is known as satiation and psychological satisfaction (Arar Khaled Hosni, aforementioned reference,

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p. 6 adapted ).

## **9. CONCLUSION**

To conclude this research paper, and after identifying the high process of "symbolic cognitive representation" in the educational sports field, we concluded that this mental process is of great importance to educational sports practice, which is not limited only to the cognitive aspect of the learner, but also to various psychological and physical aspects.

Due to the cumulative knowledge, the researchers group can only emphasize the importance of completing research studies on the various mental processes in the educational sports field for the benefit of the teacher, the learner, the educational environment and society as a whole, our goal to achieve what is known as the comprehensive development of the individual and the preparation of a good citizen Able to cope with various life conditions.

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