Proposal for a new method for teaching fundamental motor skills

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Abstract

During the period of acquisition and first practice of movement skills, learning becomes more effective when various sensory channels are used. According to the Dual Coding Theory, students as learners code both visually and verbally incoming information into knowledge that can be stored and retrieved for subsequent use. The aim of the present study is the proposal of a new method for the teaching of fundamental motor skills that will be depended on a visual coding of movement information. Particularly, the morphological method for the analysis of dance is the proposed method according to which graphic visual symbols will be used to represent movement skills. It is expected that the use of the proposed teaching method will make teaching more effective, improving in this way the students’ motor skills.

Keywords: Symbolic codes; Visual literacy; Dual Coding Theory; Morphological method

1. Introduction

In the frame of the educational curriculum, physical education teachers are strongly preoccupied with the teaching of movement skills. Through research, and the combination and the application of various techniques and methods, they try to increase the effectiveness of their teaching. Effective physical education teachers are expected to master a variety of teaching methods that foster student learning in all the dimensions of physical education (Derri & Pachta, 2007). Particularly, the learning of fundamental motor skills like balance skills, locomotive skills etc, or more specialized ones like coordination, which increase students’ self-esteem (Kovar et al., 2007), makes participation in organized movement activities easier. Gallahue and Ozmun (1998) suggest that basic motor skills can be developed easily through specially organized physical education games and activities.

However, the design of new learning activities must take into account first that visual and verbal information are organized and processed differently and second that all students will not learn in a similar way. According to Dual Coding Theory (Paivio, 1986), students as learners code both visually and verbally the incoming information into knowledge that can be stored and retrieved for subsequent use. On the other hand, each one of them is characterized by a different style of acquiring and processing incoming information (cognitive style) (Kogan, 1971). Cognitive style is “the individual's consistent and characteristic predispositions of perceiving, remembering, organizing,
processing, thinking, and problem solving” (Liu & Ginther, 1999). Consequently, learning performance is affected by the interaction between cognitive style and instructional format (McKay 1999). It is obvious that when an inconsistency occurs between cognitive style and the mode of presentation-instruction, performance will likely be reduced (McKay, 1999). Thus, the teachers’ quest of new teaching methods that will be addressed to a wider range of learning abilities becomes more than imperative.

Education today needs to foster a variety of literacies to empower students and to prepare them adequately for the demands of the present and the future (Kellner, 1998). The need for developing the students’ total range of skills by which they will be able to perceive visual information in order to learn, communicate and express themselves becomes urgent. Visual literacy as one of the multiple literacies (Kellner, 1998) has been recognized as a necessary component of a comprehensive education. As Avgerinou and Ericson state (1997) “...the need for visual training has become more than understandable”. Yet, visual literacy is almost a neglected area of communication in the school curriculum (Dondis, 1973).

Based on the above, the aim of the present study is the proposal of a new method for the teaching of fundamental motor skills that will be depending on a visual-graphical print of movement information regarding body supports, timing, body gestures, etc. Particularly, the morphological method for the analysis of dance is the proposed teaching method according to which visual-graphical symbols will be used to represent basic locomotor skills like i.e. walking, skipping, etc. Based on the Dual Coding Theory (DCT) (Paivio, 1986), teaching will combine the live performance of the aforementioned skills from the teacher (visual), with their graphical-symbolic print on a horizontal surface (visual-verbal). It is expected that the use of the suggested teaching method will improve the students’ motor skills, making in this way teaching more effective.

2. Dual Coding Theory and Visual Literacy

Cognition according to DCT involves the activity of two distinct subsystems, a verbal system concerning the language and a nonverbal (imagery) system concerning nonlinguistic objects and events (Paivio, 2006, p.1). According to Paivio (1971), visual and verbal information are coded differently as analogue and symbolic codes respectively: analogue codes represent things that people observe in their environment while symbolic codes are a kind of represented knowledge that is set to stand out for something arbitrarily (symbols). This two-way incoming information is better encoded, comprehended, recalled and elaborated. In particular, when the visual and the verbal codes are functionally independent, the effects on their recall by the students are additive (Suh & Moyer-Packenham, 2007).

DCT also provides a theoretical background that is useful in understanding a noncognitive domain as that of the motor skills’ acquisition and retention. According to Clark and Paivio (1991, p.188) “...images, verbal representations, and associative and referential processes are implicated in many experimental studies of motor skills, and permit the development of specific models relevant to a wide variety of educational topics...”. Several research projects have proved that students who practiced on relevant verbal and visual-imagery codes, as well as associative and referential processes during instruction of new motor skills, performed better on these tasks than the control groups (Feltz & Landers, 1983; Goss et al., 1986; Gerst, 1971; Rosenthal et al., 1972). The more pathways learners used to remember information, the more information they could recall later on.

However, according to Mayer (2003), meaningful learning occurs when learners manage: a) to pay attention to representative words and pictures and mentally organize them into verbal and pictorial representations so as b) to integrate these verbal and pictorial representations with each other and with prior knowledge. While many students may be able to react to visual material, the vast majority of them need to be taught what are the grammar and the logical organization of the “visual text”. Rieber, cited in Suh and Moyer-Packenham (2007), reports that it is easy to recall information from visual processing codes because visual information is accessed using synchronous processing rather than sequential processing. As a result, since our visual sense is the most dominant and consequently the most important one, Avgerinou and Ericson (1997) suggest that we should exploit it through the nurturing and the development of visual literacy.

While visual literacy is not necessarily a new pedagogy (first international conference for visual literacy was held in Chicago in 1970), it can be best viewed as an emerging pedagogy (Brown, 2004). According to Bamford (2003), visual literacy is not something that can be confined to one particular area since it has emerged from a number of disciplines including visual arts, art history, aesthetics, humanities, philosophy, psychology, perceptual physiology, sociology, cultural studies, media studies, instructional design, semiotics, communication studies and educational technology. As a result there has been a definitional controversy among researchers because each one of
them approached the term from their own scientific specialization. In particular Bamford (2003) refers to Sinatra, Boughton, Messaris and Kazmierczak. As a term it was first used by John Debes as early as in 1969, who suggested the following definition:

“Visual Literacy refers to a group of vision-competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, symbols, natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use of these competencies, he is able to comprehend and enjoy the masterworks of visual communication.”

However, according to the International Visual Literacy Association (IVLA, 1989), visual literacy refers to the following characteristics:

i. A group of competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences.

ii. The learned ability to interpret the communication of visual symbols (images), and to create messages using visual symbols.

iii. The ability to translate visual images into verbal language and vice versa.

iv. The ability to search for and evaluate visual information in visual media.

The mastery of all the previous abilities implies highly developed perceptual and spatial skills. Perception involves both the processes of seeing and interpreting, while spatial ability relates to the way a person perceives and moves in space (Willmot, 1999). Therefore, the performance of any kind of movement – either basic or complex - which involves the activation of both perceptual and spatial skills, seems to be highly facilitated by the development of the ability to encode and decode visual information. Emphasizing on symbols as a means of communicating visual information is a strategy used by many teachers who wish to apply symbols as characters or coding elements. Cultivating their students’ ability to discriminate and categorize, they manage to foster their capacity to respond to descriptions through symbolic representations. British scholars have long been calling for attention to the impact of ‘visual literacy’ and the reading of meaning in symbol systems beyond the use of alphabetic script (Heath 2000, p.123). Only via facilitation of the best possible learning experience and utilization of multiple communication tools, should teachers achieve their educational goals, which in the present study are the development of basic motor skills.

3. Motor Skill Development

According to Gallahue and Ozmun (1998), during childhood the development of basic motor skills is essential because through them children explore the world. Cleland and Gallahue (1993) also state that movement experiences increase the ability of children from four to ten years old to perform simple motor skills. The learning of basic motor skills, promotes the development of basic motor abilities like coordination, speed, balance etc, and it is difficult to make up for the lack of these abilities later on in adulthood. Focusing especially on basic locomotor skills - which are the building blocks of more specific skills-, it is proved that their acquisition facilitates the learning of dance and sport skills (Deli et al., 2006). According to the Gallahue’s model of motor development (1996), walking, running, hoping, galloping, skipping and sliding are some of the most important locomotor skills. The development of such a knowledge base facilitates children’s motor engagement, decreasing errors in performance both in and out of the school setting (Derri & Pachta, 2007, p.38).

Effective teaching and encouragement by the physical education teacher can enhance the development of such skills (Graham, Holt/Hale & Parker, 2003). However, effective physical education teachers are those who not only master a wide variety of teaching styles and methods, but are also able to manipulate them so as to increase students’ learning in all the dimensions of the curriculum (Garn & Byra, 2002). As Ulrich and Ulrich state (1985), through the instruction of developmentally appropriate movement programs as well as through the implementation of effective teaching methods, students will improve their performance more than those who simply engage in free-play activities.

The following morphological method for the analysis of dance movement can be applied successfully to the teaching of basic motor skills. As a teaching method it will combine the teaching of basic structural movement units and compositions together with their development in time and space. Bearing in mind that when the instruction of movement skills or patterns is combined with suitable rhythmic patterns, there seems to be a greater improvement in
the learners’ motor skills (Ulrich & Ulrich, 1985; Deli et al., 2006; Weikart, 1998), it is expected that the morphological teaching method will be effective as well, since it employs the parameters of rhythm and timing.

4. The Morphological Method for the Analysis of Dance

The term dance morphology has been used to denote the study of the dance form which is comprised of two basic elements: structure and style. Structure refers to the invariable components of dance, while style to the variable ones. The dance form is the composition of the inner elements, structural parts and levels of dance and music, which result in the combination of human movement with music and rhythm, so as to produce a special style (Tyrovola, 2001). Consequently, the morphological method for the analysis of dance aims at disclosing the implicit existent grammar in each dance form. This is achieved through:

a. The study of the structural levels of dance successively (elements, cells, motives, dance phrases, segments, parts, dance choreography).

b. The study of the above levels in relation to the music structure and rhythm.

The most important study that laid the groundwork of morphological analysis in movement terms only was the study of Martin and Pessovar in 1961 (Tyrovola, 2001, p.23). The previous researchers analyzed the folk dances of their country in relation to music, at the level of the movement motive (simplest synthesis and organization of single human body movements) which was studied as the smaller unit with special importance. Later on the same researchers (1963) introduced a morphological model of analysis and classification of folk dances that was based on three basic combinations of the support indexes (time duration of leg ground support) in relation to gravity. These combinations are the following:

i. The double support when the weight remains on both feet (left and right) within the same phase.

ii. Change of the supports in two successive phases of the motive. The body weight is transferred from one foot to the other.

iii. The repetition of one support when the weight of the body is lifted from one support but is replaced on the same support in two subsequent motive phases.

Starting at the level of the movement motive and proceeding on to the levels of the movement phrases, the synthesis of these three basic combinations in relation to the use of time and space can produce a big variety of dance and movement types. A symbolic and coded depiction of these basic dance units in relation to the use of time and space was introduced by Tyrovola (1994, 2001) as a way of studying, comparing and teaching the dance form (structure and style). In particular, Tyrovola used letters from the Greek and Latin alphabet in order to symbolize graphically the previous dance units. These symbols were the following:

• \((\delta^*+a^*)\) or \((a+\delta)\) The body weight is transferred from one foot to the other.

• \((a:\delta)\) The double support.

• \(\[(\delta)\alpha_1\text{ or } (\alpha)\delta_1\]\) Support on one leg and lift of the other.

In practice, the morphological method can enhance the learning of basic locomotor skills especially as far as their technical characteristics are concerned. The suggested symbolic representations of these three combinations can function as a visual message ready to be encoded and decoded. Moreover, their enrichment with time and space symbols is expected to increase the students’ ability to utilize and apply spatial perceptual skills efficiently. The latter is certainly of major importance for the performance of motor skills (basic or complex). Taking for example the teaching of walking (which is one of the simplest locomotor skills), the following suggestions can be made as far as the use of the morphological method is concerned: 

- (α= left foot & δ=right foot)
1. At the beginning of each walking cycle—distance covered by two heel strikes of the same foot—can be divided into its “movement motives”. In particular: a) the swing motive which begins when the foot of one leg leaves support surface and ends when the foot touches the surface b) the support phase which is when balance is maintained on one foot and c) the double support phase which is when both feet are in contact with the ground.

2. Afterwards, each movement motive can be represented symbolically and practiced separately i.e. a) is symbolized as \([\circ \vec{a} + \circ \vec{a}]\) or \(\circ \vec{a} + \circ \vec{a}\) and b) as \([\circ \vec{a} \circ \vec{a} \circ \vec{a}]\). The addition of time and space elements can produce various movement combinations which can function as a basis for the teaching of more complex skills like dance movements, preparation steps for jumping, shooting or throwing skills etc. Example: \([(\circ \vec{a} + \circ \vec{a} + \circ \vec{a}) \circ \vec{a}]\) is a symbolic depiction for the last three running steps before the javelin throw.

5. Conclusions - Pedagogical Implications

Whether we acknowledge it or not, we live in an era of visual culture (Avgerinou & Ericson, 1997) and a big percentage of our learning depends on visual information (Spencer, 1991). According to Schirato and Yell (1996), in the modern western world, communication is mainly based on the promotion and management of information through visual media, while a person is considered to be literate when he/she can identify, decode and analyze this information. Among others, a student should have the ability to successfully decode and interpret visual messages. Especially, during the period of the acquisition and the first practice of basic movement skills, the role of our senses through which we interact and learn about the world around us (Walker & Chaplin, 1997) is decisive. At this period learning becomes more effective when various sensory channels are used i.e. visual media, colors, movement, sounds etc. (Kearnsley, 2000). The morphological method for the analysis of dance can be a valuable tool for the teaching of fundamental locomotor skills, when it is used as a teaching method. Its graphical–visual codification is expected to enable the process of coding and decoding of the basic structural movement parameters, making their learning easier. It is imperative that educators embrace the concept that the use of the visual metaphor is now the predominant communication tool (Shankey, 2002). Some years ago visual literacy skills were considered as students’ future needs, but today these needs are here undoubtedly imperative (Avgerinou & Ericson, 1997).

References


