PHYSICAL LITERACY AND HOLONIC THEORY: AN INTEGRATED APPROACH IN PHYSICAL EDUCATION TEACHING

PHYSICAL LITERACY E TEORIA OLONICA: UN APPROCCIO INTEGRATO NELLA DIDATTICA DELL'EDUCAZIONE MOTORIA

Pompilio Cusano
Università Telematica Pegaso
pompilio.cusano@unipegaso.it

Double Blind Peer Review

Citation
Cusano, P. (2025). Physical literacy and holonic theory: an integrated approach in physical education teaching, *Italian Journal of Health Education, Sports and Inclusive Didactics,* 8 (4). https://doi.org/10.32043/gsd.v8i4.1264

Doi:
https://doi.org/10.32043/gsd.v8i4.1264

gsdjournal.it
ISSN: 2532-3296
ISBN: 978-88-6022-504-7

ABSTRACT
In physical education, the approach based on physical literacy places the individual at the center of the learning process, encouraging the dynamic interaction between body and environment and supporting an integrated development that involves physical, cognitive and social aspects. The proposed model emphasizes the importance of situated learning and cooperation, underlining how physical education can be a tool to improve overall well-being and promote autonomy and active participation of students in everyday life. Through Koestler's holonic theory, which interprets each element as both part of a larger system and as an independent entity, a theoretical basis for inclusive and flexible teaching is established. This approach can help build skills that last over time, creating an educational context that can adapt to the specific needs of each individual, while promoting cooperation and understanding between peers.

Nell'educazione motoria, l'approccio basato sulla physical literacy pone l'individuo al centro del processo di apprendimento, incoraggiando l'interazione dinamica tra corpo e ambiente e supportando uno sviluppo integrato che coinvolge aspetti fisici, cognitivi e sociali. Il modello proposto enfatizza l'importanza dell'apprendimento situato e della cooperazione, sottolineando come l'educazione motoria possa essere uno strumento per migliorare il benessere complessivo e promuovere l'autonomia e la partecipazione attiva degli studenti nella vita quotidiana. Attraverso la teoria olonica di Koestler, che interpreta ogni elemento come sia parte di un sistema più grande sia come entità indipendente, si pone una base teorica per una didattica inclusiva e flessibile. Questo approccio può contribuire a costruire competenze che durino nel tempo, creando un contesto educativo capace di adattarsi alle necessità specifiche di ciascun individuo, favorendo al contempo la cooperazione e la comprensione tra pari.

KEYWORDS
Physical Literacy; Physical Education; Holon; Cooperation; Autonomy
Physical Literacy; Educazione Motoria; Olone; Cooperazione; Autonomia

Received 11/11/2024
Accepted 08/01/2025
Published 13/01/2025

Introduction

The intellectual legacy of Arthur Koestler (1905-1983) transcends his time and still offers a modern perspective for the study, interpretation and management of complex systems, including education. Koestler wrote in 1967 "The Ghost in the Machine", a text in which he first used the term "holon", a concept that was further developed in 1970 in the article "Beyond Atomism and Holism-the concept of the holon". The conceptualization of the term "holon" finds its basis in the attempt to overcome the dichotomy between holism and reductionism and to take into account both the individualistic and integrative tendencies of any agent interacting within a complex system. Koestler (1970) observes that "whenever there is life, it must be organized hierarchically. Koestler's hierarchy: is a multi-leveled, branched and stratified structure. A system that branches into subsystems, a structure that encapsulates substructures, a process that activates subprocesses. Holons have an organization that is at the same time hierarchical (pyramidal) and heterarchical (horizontal), for which Koestler coined the term holarchy (hierarchy + heterarchy).

The "holonic" theory is also a candidate for the study of models of human social systems, because it is able to analyze both the microlevel of individuality and the macrolevel of community. The concept of "holon" designates an entity that is, at the same time, something defined in itself and a part of a larger whole. An atom is defined in itself, but it is also part of something more complex when it participates in the structure of a molecule. When the molecule participates in the cellular structure it is a holon, embedded in a more complex system. An organ is a part in itself and, at the same time, a part of an organism. Reality as we perceive it can be seen as an infinite series of holonic relations. Holons have agency, individuality, autonomy, commonality, mutuality, and collective relations. They have the capacity to transform into larger, more complete agents and to emerge creatively and indefinitely. Koestler (1970) observes that parts and wholes have no absolute value in nature, what matters is how parts and wholes are holistically connected. Holonic theory has been widely used in recent years in a wide range of fields, ranging from production systems (Babiceanu and Chen, 2006; Valckenaers et al., 1998) to multi-agent computing systems (Beheshti et al., 2016), from climate change communication (Briggs, 2007) to industrial ecology (Kay, 2003). Holonic theory does not seem to have been taken into account in the field of sports education, although it seems to have great potential in this area, as demonstrated, for example, by the interest that this theory has aroused in the field of education in general. Recently, Gallifa (2019), reasoning on the popularity of the teaching process based on "thinking skills" (Wegerif, 2002) - much appreciated in our information age -, expressed the idea that a paradigm shift towards more complex systems of thinking is needed, in the sense of "... desire to teach thinking and learning processes that can be applied in a wide range of real-life contexts [...] information processing, reasoning, inquiry, creative thinking and evaluation". Ennis (1985), in his seminal article "A logical basis for measuring critical thinking skills", defined cognitive skills as "[...] reflective and reasonable thinking that focuses on deciding what to believe or do", while Paul and Elder (2006) define it as "the art of analyzing and evaluating thinking in order to improve it". Gallifa (2018; 2019), instead, predicts a sort of fusion of the General Systems Theory (von Bertalanffy, 1968; Boulding, 1956) with Koestler's holonic theory.

1. Sports education today

Motor and sports education, in accordance with the theoretical aspects related to all educational fields, deals with the subjective and personal nature of the teaching and learning experience (Sequeira, 2017). Motor education is aimed at individuals who experience a peculiar education conveyed by both the mind and the body. In this context, the body assumes, as is known, an extremely relevant importance, as the bodily perception of the subject who learns interacts incessantly with the surrounding environment in continuous transformation. This continuous transformation is able to generate new knowledge and skills, making teaching sports a particularly stimulating experience for both the teacher and the student (Ceciliani, 2018). Lave and Wenger, in their 1991 book, introduced the concept of "situated learning" placing the didactic emphasis on the whole person, seen as a constitutive agent that operates and interacts within a complex system. These authors thus overcome the approach to learning procedures seen as a somewhat passive transmission of concepts and factual information, revealing, at the same time, the profound social character of education. The approach of sports education falls fully within this line of thought, since it interprets the learning process as a way to participate in communities that learn by practicing. Today, constructivist and situated learning perspectives are considered the main conceptualizations for teaching and learning in physical education (Dyson et al., 2004). The main learning models are represented by: a) sports education; b) tactical games; c) cooperative learning. According to these authors, sports education is "a functional model that connects sport taught in physical education to sports culture in a broader sense". This line of thought is very consistent with "structural functionalism", defined as "a framework for theory building that sees society as a complex system whose parts work together to promote solidarity and stability" (Macionis and Gerber, 2011).

The second sports learning strategy that Dyson et al. (2004) emphasize is tactical games. This is a teaching method that aims to reduce the obstacle of the more purely technical aspects, appropriately modulating some rules of the game in order to allow participants to understand and develop, step by step, both the technical and tactical characteristics of the game. The tactical game approach allows the student to discover the underlying similarities between different sports disciplines, in a sort of "holistic" vision of games. Having a specific set of games with similar tactical problems, understanding them helps to transfer performance from one game to another, as they are framed in a similar technical and tactical structure.

A third learning model envisaged by Dyson et al. (2004) is cooperative learning. The theoretical basis of this teaching model was defined by Johnson and Johnson (1999) in a seminal paper that has had a wide influence on pedagogy. It can be defined as an instructional strategy that allows small groups of students to work together on a common task. Each student becomes a significant participant in the learning and can be individually responsible for their part or role in the task. Cooperative learning also has social effects, such as positive intergroup relations and the ability to work collaboratively with others. This teaching method is also able to develop social skills, as group members become aware of the importance of interpersonal, social and collaborative skills. It is easy to see the underpinnings of both holonic theory and general systems theory.

2. From general systems theory to integral thinking and integral education

Richardson (2004), in the preface to the reprint of "General systems theory: The skeleton of science", quoted the following sentence by Boulding (1956): "... a theory of this kind would be almost devoid of content, because we always pay for generality by sacrificing content, and all we can say about practically anything is almost nothing". Boulding's warning refers to one of the most common criticisms of General Systems Theory, sometimes negatively perceived as a "theory of everything". Contrary to this criticism, the fundamental and most typical characteristic of the theory is the attempt to identify universal principles applicable to the system in general, independently of the nature of the system itself (von Bertalanffy, 1968). This need has been recognized as imperative by von Bertalanffy (1968) because the increasing fragmentation of disciplines, as well as the ever greater progress of scientific and technological research, sharpen the antithesis between mechanism and vitalism. This antithesis is perceived by von Bertalanffy (1952) as the most important antipodal confrontation of biological thought that must be reconciled through an "organismic conception", which takes shape in a general theory of systems formulated mathematically (Gregg, 1953). Considering the works of Boulding (1956) and von Bertalanffy (1968), as well as the excellent review by Laszlo and Kripnner (1998) on the origins and foundations of systems theory, we try to contextualize the idea of "system" in the framework of education in general, and sports education in particular. It is necessary to make some considerations on the definition of the concept of "system". This can be formalized, in its broadest form, as an undefined number of components (a feature that allows its "reduction to components") that interact with each other (a feature that allows its "reduction to dynamics") and that operate within boundaries that guarantee the maintenance of both the entity and the process.

The identification of boundaries, an essential prerequisite in general systems theory, can be difficult to achieve in some fields of the human sciences, such as sociology and psychology, where the number of interactions incessantly shapes the behaviors of a number of system components exposed to forces and events outside any possible definition of boundaries. Both the heuristic approaches "reduction to components" and "reduction to dynamics" aim to simplify the overly complex set of phenomena that characterize all active systems in our world. Such simplification is necessary to "organize order out of chaos", since chaos is often perceived as the leitmotif of nature. Worster (1990) goes so far as to state that: "What is there to love or preserve in a universe of chaos? How should people behave in such a universe?" Thus, "reduction to components" is seen as the only way to reorient chaos into order, through the inventory and study of the smallest component of any system. The heuristic approach, alternative to the "reduction to components", is therefore the "reduction to dynamics". The study of the smallest component of a system cannot take into account both the behaviors of each component, when subjected to the influence of external factors, and the emergent properties, which come to light when one proceeds from a lower to a higher level of organization. In this regard, Laszlo and Kripnner (1998) state that: "Structurally, a system is a divisible whole, but functionally it is an indivisible unit with emergent properties. An emergent property is characterized by the appearance of new features that manifest themselves at the level of the whole, but not by the isolated components. There are two important aspects of emergent properties: first, they are lost when the system is broken down into its components - the property of life, for example, is not inherent in organs once they are removed from the body. Second, when a component is removed from the whole, that component itself will lose its emergent properties: a hand separated from the body cannot write, nor can a separated eye see. The notion of emergent properties leads to the concept of synergy, suggesting that, as we say in everyday language, the system is more than the sum of its parts."

This concept is particularly evident in the case of, for example, team sports. A single player, separated from his team, cannot display the same properties as when playing as part of the whole represented by his team. For the purposes of our approach, in accordance with Mesarovic and Takahara (1975), we could try to summarize the main goal of General Systems Theory as an attempt to explain phenomena in terms of relations and transformations of the components of a system, independently of the specific nature of the system itself. The nature of the mechanism involved (physical, biological, social, etc.) is therefore less explanatory than "formal relations between observed characteristics or attributes" (Mesarovic and Takahara, 1975).

Systems theory offers a transdisciplinary framework for the study of different aspects of social and educational sciences seen as relations between observed characteristics or attributes. Studies on cognitive development - defined as the process through which humans acquire, organize and learn to use knowledge - and on human perception - defined as the way in which information transmitted by our sensory organs is organized, interpreted and filtered through consciousness - are increasingly based on the typical approach illustrated by general systems theory (von Bertalanffy, 1968). All this opens the door to an integration between this theory and the educational sciences in general. The concepts of Integral thinking and Integral education are undoubtedly a derivation of the lines of thought specific to General Systems Theory, even if this is not always correctly understood. General Systems Theory, in fact, is not a way to reduce all thought to a single interpretative scheme. On the contrary, it is a way to overcome the dichotomy "mechanism versus vitalism" (von Bertalanffy, 1952) or "holism versus reductionism" (Koestler, 1970). According to Weckowicz (2000), one of the most important legacies of General Systems Theory is the rejection of reductionism and vitalism and the emphasis on creativity and the organized complexity of human behaviors. Human culture makes man unique and different from animals, despite the many essential biological characteristics that we share with them. Man is the only living organism capable of living in a world of symbols, or rather in worlds of symbols, interposing symbols between himself and the physical objects that populate the perceptible world. The most appropriate name for man is therefore "homo symbolicus". Taking all this into account, it is clear that General Systems Theory, beyond the original and specific biological context for which it was conceived, and according to the theorists who have codified this approach (Boulding, 1956; von Bertalanffy, 1952; Koestler, 1970), can be useful in numerous applications, including educational strategies. Floyd (2008) has observed that, since the pioneering work of von Bertalanffy in the 1960s, so-called systems thinking has matured enough to explore disparate domains of inquiry, outside the highly specialized fields from which it emerged and was theorized. The same author is keen to differentiate systems thinking from systems theory, stressing that the latter is above all an epistemology, while systems theory is a representational tool based on "four basic ideas: emergence, hierarchy, communication and control" (Chichester, 1981 cited in Floyd, 2008). In our opinion, a correct schematization of systems theory should not omit a fifth basic idea: boundaries, a fundamental element without which a system simply cannot exist. It is a bit surprising that some theorists of Integral Education have not cited in their works the founders of the "integral way of thinking", just mentioned. Murray (2009), admitting that "integral education" represents more than the sum of various theories (a concept derived from the work of von Bertalanffy), defines as "integral" the meeting point of four perspectives: model, methodology, community and capacity. According to this author, the model can be defined as a "system of concepts to interpret the world". In this case, one of the most peculiar characteristics of the model, as conceptualized in the General Systems Theory, is lost. We refer to the definition of "system boundaries", an assumption of fundamental importance in the analysis of system dynamics. Even the concept of holism, as interpreted by Murray (2009), seems to have lost its richness of potential to explore the space of human thought, since this author defines it as: "Holism: A recognition and appreciation of the "whole person" or "whole child" - mind, body, heart, spirit and community are all interconnected and important. Artistic expression, movement and bodily health, spontaneity and fun, interaction with the natural world and service are as important to creating good citizens and realizing students' full potential as "content" learning. The physical layout of the classroom, what a student had for breakfast, and whether there are caring parents to see them walk out the door, all affect their learning and engagement". This definition reduces the space of interactions to those related to the single individual, hiding, in some way, the holonic nature of everything that interacts with him. However, as Floyd (2008) points out, the transition from general theories of system dynamics to integral thinking and education has to solve a specific problem, since educators explicitly expose the observer from the confines of the observed system. In other words, such theories have "a strongly objectivist position" (Floyd, 2008), since "they are not designed to take into account the relationship between those who study the system and the understanding that their study creates" (Midgley,2000). In the sociological-educational field, all this represents an obvious disadvantage. Furthermore, this peculiar field is hardly comparable to biological systems since, according to theorists of deconstructivism/postmodernism, "meaning depends on context and contexts are boundless" (Floyd, 2008). Accepting the unbounded nature of contexts, the foundation of integral thinking on theories of general system dynamics faces a sort of epistemological problem: how to ground the dynamic analysis of interacting objects within a system without defining the boundaries of the system? This impasse is probably more theoretical than practical, in the sense that some specific fields could escape this bottleneck by focusing on delimited subsystems of unbounded systems. Sports education, operating in the specific context of the sports discipline, could, in this sense, think of defining the boundaries of its application domain by taking into account the specific nature of the sports team. A team, therefore, could be treated as a delimited system belonging to a unbounded social context.

Although this approach could be considered forcedly approximate, it actually represents an operational choice capable of overcoming an otherwise paralyzing dead end. According to Murray (2009), the term "integral" combined with education, or more generally with pedagogy, indicates four interrelated points:

• model (intended as a system of postulates, data and inferences presented as a description of one or more entities of the real world)

• methodology (intended as a body of methods, rules and self-evident bases for the reasoning employed by a discipline)

• community (intended as a group or groups of people to whom integral models and methods are applied),

• capacity (intended as an evolutionary stage of thought capable of compromising modern and postmodern cultural perspectives and formal operational modes of thought).

All these points, considering the peculiar field of sports education, could benefit from the "integral" approach in the broadest sense of the term. It is now a question of moving from the widely shared constructivist and integral thinking approaches to a paradigm capable of merging different learning models into a general system, while maintaining all the peculiarities of each model.

3. Holonic approach in sports education

The term holon designates entities that simultaneously exhibit autonomous behavior, cooperation, and synergy. Ulieru et al. (2001) emphasize the importance of balancing the possible contradictory forces that drive each of these properties at the behavioral level. As observed by Calabrese (2011), in this type of "autonomous cooperation" the property of "emergence" is rooted, since in complex systems we witness the emergence of characteristics that cannot be deduced from lower levels of organization. According to Wilber (2000), the holonic approach is much more than an interpretation of recurring patterns within a systemic dynamic, which is made possible thanks to the interaction between holons. This author states that: "In all these movements and in others, we see the radiant hand of the logical-vision that announces the infinite networks of holonic interconnection that constitute the very fabric of the Kosmos". Apart from the possible interpretations of the inner structure of the cosmos, the holonic theory is a very useful tool for the analysis of the "... fields within fields, patterns within patterns, contexts within contexts, ad infinitum" (Wilber, 1996) that constitute the very fabric of nature, including the social fabric. Wilber (2000) describes the holonic nature of our world as follows: "In other words, we live in a universe that consists neither of wholes nor of parts, but of wholes/parts, or holons. Wholes do not exist alone, nor do parts exist alone. Every whole exists simultaneously as part of another whole, and as far as we know, this whole is indeed infinite. Even the entire universe at this moment is simply a part of the whole at the next moment. There are no wholes and parts anywhere in the universe; there are only wholes/parts." Holarchy implies recognizing that every agent in our world, regardless of its level of organization, is part of a whole that co-evolves with the parts it is composed of. This co-evolutionary process incessantly creates and reshapes the creation of meanings. All this, translated into meaningful behavioral patterns, leads us to rely on self-affirmation (as holons) and integration (again as holons) making our collective participation and support beneficial for both the whole and the individual. This is particularly true in team sports dynamics and applies perfectly to sports education where holons and groups of holons show bidirectional interactions, networking, multiple simultaneous states of interaction in a decentralized structure. Such a scheme could be introduced into sports education without too much difficulty, instilling in students the concepts of “equifinality” and “common goal” and describing the holonic structure of a sports team oriented to a coordinated action arising from independent holons.

Conclusions

This article does not claim to build a holonic theory of sports science teaching through the complete definition of mechanisms, structures and educational processes. Our aim is to underline the undeniable potential of the holonic interpretation of sports teaching, through the examination of its theoretical assumptions and the links that exist between this theory and other educational paradigms accredited in this field. A more complete operational definition, through the identification of specific educational strategies, which allows the complete implementation of the holonic theory applied to sports teaching constitutes a future and fruitful field of both pedagogical and didactic research.

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