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ESSAYS

INCIPIENT REFLECTIONS ON THE STUDY OF THE EPISTEMOLOGY OF PHYSICAL EDUCATION

REFLEXÕES INCIPIENTES ACERCA DO ESTUDO DA EPISTEMOLOGIA DA EDUCAÇÃO FÍSICA

REFLEXIONES INCIPIENTES SOBRE EL ESTUDIO DE LA EPISTEMOLOGÍA DE LA EDUCACIÓN FÍSICA

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Abstract: The article presents reflections that foster the debate about the epistemology of Physical Education. To do this, it seeks to answer the following question: what qualifies scientific knowledge and what theoretical models help to understand the scientific organization of Physical Education? The delineation of the possible answer is based on the theoretical-conceptual dialogue with the metatheories of Karl Popper and Thomas Kuhn, as well as with theories from Physical Education authors whose proposed models contribute to elucidate issues affecting the subject. By using categories that put the scientific stance into perspective, the text highlights key elements in the organization of fields and systems of knowledge. Specifically, regarding the field of Physical Education, it problematizes the myth of the context and the lexical diversity arising from the proposed models, inviting an exploration of the multiple epistemologies that constitute it.

Keywords: Epistemology. Physical Education. Science. Movement.

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1 INTRODUCTION

The study of the epistemology applied to Physical Education[1] that this article deals with emerges from the interest in understanding the demarcation of the epistemological horizons of this field, that is, the ways in which it was and have been scientifically organized. This study is oriented towards a current debate of paramount importance for professional organization, as well as for interventive and investigative direction within the field. This is because the scientific delineation of knowledge determines the approaches to truth as much as it reflects social rationality (Popper, 1994; Morin, 2015).

As demonstrated by Fenstenseifer (2000), Martinez, Fugi, and Souza (2020), Bungenstab (2022), Souza (2023), among other authors, the debate concerning the scientific status of Physical Education in Brazil is characterized by different phases, which impact and are impacted by various epistemic "models". These phases include: the establishment of an identity that would confer scientific legitimacy upon the field, between the 1980s and 1990s; the focus on the bipolar fragmentation (scientific and pedagogical aspects) of the rationality underpinning it, during the transition from the 1990s to the 2000s; and the potential integration of the various discourses shaping the field's dynamics into a possible (or not) consensual epistemological unity, extending into the current years.

In pursuit of this linearity, the present study aims to contribute to the emerging epistemological activity advocating for a plurality of ideas and theories within the field, without losing sight of its unity. This requested, primarily, recognizing that there exists a system of knowledge that enables us to organize the profession. There is a body of knowledge that is continuously updated and supports our practice, albeit with reservations. However, what qualifies this knowledge as scientific? What theoretical models are informed by knowledge relevant to Physical Education, and how do these models assist in understanding its scientific organization?

Seeking to outline responses to these questions and stimulate the debate concerning the epistemology of Physical Education, this study is organized into two phases. Initially, we explore metatheoretical aspects informed by Karl Popper and Thomas Kuhn regarding the progress of scientific knowledge. Subsequently, we revisit elements that reflect this progress within the field of Physical Education, through analytical prompts that invites to reflect on its scientific demarcation, notably by highlighting some of the principal theoretical models proposed to substantiate scientific practice in the field from the profession itself.

1 The article summarizes the discussions that took place in a *stricto sensu* postgraduate course that took place in 2023 (from March to October), whose syllabus focused on the study and application of the principles of scientific meta-theories (with an emphasis on the Popperian and Kuhnian models) to the epistemic understanding of Physical Education.

2 POPPERIAN CRITICAL RATIONALISM AND KUHNIAN HISTORICIST RELATIVISM

For Popper, scientific knowledge represents a systematized approach to truth through reason and critique. These elements enable the formulation of conjectures about a phenomenon and the deduction of a particular truth regarding it. With this method, Popper not only critiques the inductive perspective (generalization of truth from a set of particular observations) but also demonstrates that scientific laws are products of human reason, that is, they arise from the apprehension of phenomena by observers. This observation allows for the identification of empirical evidence upon which to conjecture, conduct tests, engage in critical discussions, and envision ways to refute the truth(s) constructed in this process.

When a specific body of knowledge constitutes a theory with clear criteria for scientific demarcation, that is, based on evidence and conjectures subjected to peer review and attempts at "failed" refutation, we can then categorize it as a scientific theory. This Popper's proposition highlights a way to address the "myth of context", or the claim to universality of a singular statement as a unique truth around which a specific linguistic and social pattern is established. According to Popper, a statement is scientific if and only if it is falsifiable, subject to criteria of refutation rather than verification or confirmation. This is the logic around which Popper believes scientific practice should be organized: to use hypotheses formulated within a field as a basis for studies aimed at refuting them, rather than as support for maintaining a particular "context".

The context and language are metaphorically assumed by Popper as "prisons". For him, the effort of critical attitude in the face of the awareness of the "suffering" that the prison unleashes makes us capable of escaping from it to a "bigger prison" (another context, another language), thus altering our view of the world. It is in this sense that Popper (1994, p. 76-77) states that

> Prisons are the contexts. And those who do not like prisons will oppose the myth of context. They will welcome the opportunity to discuss with a partner from another world, from another context, for this offers them the opportunity to discover their own chains, which had been unnoticed before, or to break them and thus surpass themselves. But leaving the prison is not, of course, a matter of routine: it can only be the result of critical effort and creative effort.

The critical and creative efforts highlighted by the author concern what he understands as "scientific attitude", supported by respectful and fruitful discussion among peers. This critical attitude is desirable to combat the myth of context, but there are caveats. According to the author, we should not expect that confrontations and discussions always result in agreement or consensus. We should even ask ourselves if such an agreement is always desirable: "My thesis states that logic does not support the myth of context or its negation, and that we can try to learn from each other [...]" (Popper, 1994, p. 60).

As it is based on "a complex web of assumptions" that eventually collide, human knowledge is fallible. Popper (1994, p. 60) suggests that "[...] both we and our

own attitudes are, in part, the result of confrontations and inconclusive discussions [...]". Furthermore, the author remarks that "The clash of cultures played an important role in the development of Greek science — mathematics and astronomy — and we can even specify how some of these various clashes yielded results [...]", such as the categories he exemplifies: freedom, democracy, tolerance, knowledge, science, and rationality (p. 63).

Popper notes that one of the primary functions of human reason, as well as of science, is to make the world in which we live understandable to us. This function includes two components: poetic invention and critical discussion of explanatory stories/myths. The tradition of criticism as a method was developed across generations (at least four or five) following the early Ionian philosophers — mainly Thales and Anaximander. These philosophers began to speculate about the support of the earth, setting precedents for critical discussions that were reviewed and improved by subsequent generations. Thus, "The critical tradition was founded by adopting the method of criticizing a conceived story or explanation, followed by a new, improved, and imaginative story that, in turn, becomes the object of criticism. I believe this method is the method of science. [...]" (Popper, 1994, p. 65).

The erroneous and excessive optimism that a discussion will result in the triumph over an opinion or a defeated understanding, when thwarted, triggers a generalized pessimism regarding the productivity of discussion, tending to favor the myth of context. Another tendency, says Popper critically referring to Kuhnian theory, relates to historical and cultural relativism. He notes the arbitrariness and convention surrounding rules, laws, and customs, and observes that such convention should not be disregarded by cultural relativism under the justification of differing forms of thought, linguistic patterns, or incomparable conceptual milestones. "On the contrary, we should try to understand and compare. We should try to determine who has the better institutions. And we should learn from them [...]" (Popper, 1994, p. 70).

The clash between cultures can lose its value in evoking a critical attitude if one of the parties (for example, competing theories in a field), or both of them, become convinced of their universal superiority or inferiority relative to the other. In this case, "[...] the critical attitude of trying to learn from the other will be replaced by a kind of blind acceptance [...]" (Popper, 1994, p. 75). Therefore, ontological relativity is valuable to the extent that it makes it possible to free oneself from prejudices of which one is not aware, or even from unconsciously accepted theories, resulting from their incorporation into the scientific culture in which we find ourselves.

For this reason, Popper advocates against becoming entrenched in a single theory, to avoid falling into a mental or epistemological prison. Moreover, we should demand that a theory proposed to advance scientific progress be compared with another theory by "commensurating" the solutions each proposes to the same problems and to closely related problems (contexts). However, argues Popper critically against Kuhn's view of scientific progress, such theories will continue to be described as "incommensurable" if the context is a matter of dispute. This is because the discussion would not be rationally oriented towards the merits of the theories in

approaching the truth but towards the determination or removal of a context, which sometimes aligns with the dominant theory, thus weakening the liberating potential of ontological relativity.

Incommensurability undermines the possibility of a critical argumentative construction of science by supporting the impossibility of coexistence between different theories or worldviews, even if aimed at solving the same problems. From the Kuhnian perspective, the emergence of competing theories to the dominant one signals “crises” and “revolutions” about to occur within a “discipline”, especially due to “paradigm shifts”. For Kuhn, a scientific revolution involves the disintegration of the “traditional” of a discipline and the inherent reformulation of the guiding commitments of practices, leading to changes in views of the world, reality, and phenomena.

This change occurs with the rupture of a paradigm around which the discipline is organized and the assumption of a new paradigm. The paradigm concerns “[...] universally recognized scientific achievements that, for some time, provide model of problems and solutions for a community of practitioners of a science [...]” (Kuhn, 1969, p. 13). Paradigms provide “exemplary experiences” that ground and legitimize methods, paths, and limits for the intergenerational practice of science in a particular field of research. Thus, they foster what Kuhn calls “normal science”, meaning research firmly based on one or more achievements of preceding generations of scientists.

Normal science is built upon the study of paradigms, that means the preparation of students from a common base of models shared within the field they are in, including rules and standards that legitimize and regulate scientific practice in its field. According to Kuhn (1969, p. 31), “The acquisition of a paradigm and the type of esoteric research it allows is a sign of maturity in the development of any scientific field considered [...]” (p. 31). Moreover, the revolution caused by the transition from one paradigm to another represents, for Kuhn, the usual pattern of scientific development — not a specific moment of this development, as Popper contends.

As effect of the emergence or mutation of a paradigm, the entire structure of the field is altered. Kuhn (1969) highlights two changes. One is related to the gradual disappearance of older schools, either through the conversion of their adherents or the inability of their work to adapt to the new paradigm, culminating in isolated work or association with other groups or fields of study. The second consequence is the alteration of the conditions for producing language and knowledge. Familiarity with explanatory models/systems aligned with the paradigm is assumed as a starting point for communications addressed to peers in the field in an increasingly brief (articles, reports) and specialized manner, making them inaccessible to laypeople or scientists from other fields.

“Normal research”, or “paradigm-based research”, for Kuhn, performs a “fascinating” scientific cleanup work, as it guides the researcher to concentrate their attention on restricted investigative areas and problems with depth and detail. Although this mode of research “dramatically” limits the scientist’s view, it allows for achievements that are partially permanent. For the author, normal science updates the promise of being “successful” in solving problems or discovering selected and still

incomplete examples related to the specific paradigm. However, this mode of scientific inquiry is not interested in discovering new species of phenomena or creating new theories but in articulating phenomena and theories already provided by the paradigm.

In the ordering of normal science, therefore, the emergence of a new paradigm or a new theory is seen as an indicator of crisis, disarticulation within the field, or rather, is interpreted as an "anomaly", as it signals a "novelty" in the realm of already known facts or theories. An anomaly comprises "[...] a phenomenon for which the paradigm does not prepare the investigator [...]" (Kuhn, 1969, p. 84). This leads to a "scientific discovery", a revolutionary event in the field. The perception of the anomaly tends to pave the way for the researcher to recognize and explore the novelty through experimentation and assimilation. The process of conceptual assimilation is part of the nature of discovery.

An event opens a new field of study and broadens the "potential domains of normal science", as well as modifies existing fields, particularly by introducing a "variable" into experiments and observations, as well as into instruments and methods. However, Kuhn (1969, p. 81) warns that the fact that the priority of discoveries (who they belong to or when they occurred) emerges as an issue "[...] is a symptom that there is something wrong with the image of science that gives discovery such a fundamental role [...]". In this sense, the readings and discussions underpinning this study suggest that this "something wrong" is the departure from the scientific practice of seeking closer approximation to the truth about phenomena and reality. As Popper (1994, p. 83) says,

> As long as science is the search for truth, it will involve critical and rational discussion among competing theories and the critical rational discussion of revolutionary theory. This discussion will determine whether the new theory should be considered better than the old theory, that is, whether it should be regarded as a step towards the truth.

What Kuhn refers to as the logic of scientific progress (the scientific revolution of paradigms) does not correspond to the whole, but rather to a part of the scientific organization of fields, which Popper refers to as a scientific revolution. The orientation of science towards paradigmatic revolutions trains scientists to deal with the dominant paradigm, the one that organizes a community[2] focused on a particular subject. However, this is a practice of science not interested in permanent, constant revolutions, from a Popperian perspective, given that there is no training for the prevailing critical attitude of the scientist, through which one can achieve learning via different theories and dialogue between different worldviews and phenomena. Instead of approaching the truth, what occurs in this mode of doing science is the defense of contexts/paradigms that tend to disrupt the unity of the field.

Both Popperian critical rationalism and Kuhnian historicist relativism are perspectives on the patterns of theoretical-scientific development that articulate similar ideas in defense of progress in the formulation of systems of knowledge. Despite the specifics and distinctions between their proposals, the problems these

2 Based on this, "community" means scientists who share a sense of investment in a common problem, with shared language, thought structures and knowledge systems.

authors address, and the domains from which they attempt to resolve them, both recognize that progress in science does not occur without conflicts, nor does it happen in a harmonious or linear way. On the contrary, they believe that conflicts and resistances are fundamental factors for progress to occur satisfactorily according to their understanding of scientific practice or conduct. It is in this sense that I address, next, some aspects related to the specificity of Physical Education regarding the formation of theories that guide scientific practice in this field.

3 MODELS OF THEORETICAL-SCIENTIFIC STRUCTURE OF PHYSICAL EDUCATION

If we assume that "[...] nearly all understanding is conjectural, and deciphering a new language, initially, is always rudimentary [...]" (Popper, 1994, p. 83), it becomes pertinent to epistemological formation in our field to encourage discussions such as the one undertaken by Souza (2021) in revisiting some of the "challengers"[3] of Physical Education. Such exercise allows us to better resize, both internally and externally to the field, the systems of knowledge unfolded in theoretical models around which, for better or worse, we organize our understanding of the profession. This exercise raises several questions, particularly regarding the scientific status of Physical Education, which seems to be fruitful for the debate intended by this study.

When Popper (1994, p. 83-84) asserts that "It is the scientific method, the method of critical discussion, that makes it possible for us to transcend not only what we have acquired culturally but also our innate frames of reference. [...]", in response to the provocations of Souza (2021), I find myself questioning what the challengers of Physical Education have contributed to the debate surrounding its scientific status. This question aligns with the proposition of readings that introduce the theoretical and scientific models of Physical Education as a science applied to human movement. Through this proposition, the epistemological reconfiguration initially concerns the object of interest of scientists and theorists who undertake such practice under the banner of this professional identity.

Souza's (2021) work covers issues raised by Popper and Kuhn regarding scientific development, particularly concerning the criteria for demarcating Physical Education as a science. By revisiting the critical discussion aimed at approaching truth in Popper and normal science oriented by paradigms in Kuhn, as briefly outlined, we seek to create conditions to make it more understandable, together with the historical panorama presented by Souza (2021), the contexts in which certain paradigmatic statements in Physical Education (Physical Activity, Exercise Science, Body Culture, Kinesiology, Psychokinetics, Sports Sciences) emerged and were established in

3 "[...] those who possessed the necessary conditions to lead changes in the field, not through a magical predisposition, but because they emerged as figures who not only engaged uniquely with the scholasticism of this space but also embodied this structural history in alternative ways of thinking and acting [...] sought to adopt comprehensive views of Physical Education and overcome partialities. Additionally, they proposed the justification of Physical Education in and of itself, even if at the cost of inventing foundational sciences intended to provide a basis for the profession. [...]" (Souza, 2021, p. 22).

theoretical models, as well as their resonance in the organization of scientific and pedagogical practices that underpin the profession.

The argumentative construction of the panorama presented by the author encompasses the understanding that the scientific organization of Physical Education occurred under conditions of competition for scientific and political demarcations, that is, through the defense of specific contexts and paradigms. In some instances, Souza (2021) illustrates the predominance of efforts to politically demarcate the profession by those who, in their time and with the resources available to them, sought to establish its place both academically and socially. However, one effect of these efforts is the attribution of a certain negative connotation to Sport, which the author perceives as the predominant paradigm of Physical Education in reflective modernity, alongside physical exercise (Souza, 2023, 2021).

Souza (2023) argues that Physical Education and Sport, in a broad sense, have universal reach in people's lives and daily routines, and that, increasingly, socially organized practices have had their codes/signs subjected to processes of sportification. These processes relate to various movement needs inherent to all human beings, which, according to the author, should be the goals of Physical Education, rather than starting points. This is because it treats non-utilitarian movement needs, not aimed at the construction of reality *per se*.

In discussing the foundational elements of a theory "of" Physical Education, Souza (2023, 2021) aims to indicate possibilities for scientifically and pedagogically organize the theoretical and methodological diversity within the field around the "anthropological universal" that constitutes its unity. For the author, this universal, the unity of Physical Education around which its science and pedagogy should orbit, is human movement in terms of its individual and social emancipatory potential. Not the utilitarian or goal-oriented movement, but the movements that "reside within us", that materialize in each individual's own body. This potential or quality of movement ("movability") would, in his view, be the foundational and guiding aspect of the practice of scientists and professionals in the field.

The demarcation made by Souza (2023, 2021) highlights the capacity for transferring learning related to movement experiences, that is, movements that enhance other movements and enable improved mobility in various spheres, including play, leisure, work, and similar areas. Within the scope of his theory, this transfer of learning represents part of the "transcendental experience of human movement". For the author, transcendence refers to the significance of practices and movements as "organizing signs of life" for each individual. This means that human movement has the potential to inform practitioners and foster the construction of knowledge through which actions in the world can be better directed. However, this potential of Physical Education (and Sport) is threatened and, at times, limited when professionals in the field become entangled in the competition to legitimize concepts with inclinations towards the theoretical-political demarcation of specific contexts/paradigms.

In order to minimize the effects of dispersion or internal disarticulation, resulting from the profession's entanglement in a web of disputes over theoretical-political

authority and legitimacy, the revisionist dialogue with the challengers of Physical Education helps to identify theoretical-conceptual models proposed amidst such disputes that contribute to guiding the profession towards treating human movement as a means of significance and life orientation. By engaging in this dialogue, Souza (2021) confronts the myth of context in the field of Physical Education, as critiqued by Popper. The author constructs a narrative that argues against the impossibility of productive dialogue between distinct positions or views within the field regarding its object and its various components, while also reinforcing the understanding that scientific advancement requires the resolution of issues emerging from generated paradigms.

Souza (2023, 2021) reiterates the possibility of a minimal consensus for Physical Education by proposing "movability" as a tool to weave together the epistemological unity of the field. In his view, movability integrates Physical Education both as an academic discipline and as a socially recognized profession, being understood by the author as an "anthropological universal" present in the epistemological solutions proposed by challengers to the common problem of the necessity of a model to support the structuring of the field. Among the autonomous models highlighted by Souza (2021) that align with this purpose are those of Jean Le Boulch (Psychokinetics), Pierre Parlebas (Motor Praxeology), José María Cagigal (Kinanthropology), Manuel Sérgio (Science of Human Motricity), Go Tani (Kinesiology in the Brazilian Context), and Valter Bracht (Physical Education as Pedagogical Practice). These models will be briefly addressed in this study to outline their general foundations, given the complexity of each model and the limitations of the article format.

The relatively autonomous models proposed to better organize the scientific practice of Physical Education reflect, beyond the disputes over the demarcation of the field, the existing pluralism within it. This pluralism highlights, in line with what I revisit from Popper through the course of studies, the importance of the set of knowledge systems that form the rationality of the field, as opposed to the conception of a single reason, or rationalism, in science. In their respective ways, each of these models expands the lexicon through which it is possible to discuss, signify, understand, and structure the profession and its constitutive practices, with human movement and its potentials (such as playful, transgressive, transcendental, reflective, creative, conformative, among others) serving as the guiding phenomenon.

Contrary to what supporters of the myth of context suggest, I believe that the lexical diversity of the models proposed for Physical Education highlights the falsifiability of this myth, which posits the need to establish a theoretical-conceptual consensus for successful and productive debate in resolving internal issues. By being organized, to some extent, around distinct theories (biological, pedagogical, cultural, psychological, social, etc.), the myth of context functions by updating the supposed incommunicability between the "subfields" of Physical Education (biomechanical, sociocultural, and pedagogical), through the assertion of the need to align with the linguistic and social standards that structure the dominant paradigm(s) of the field.

This myth is invoked as a justification for the "impossibility" of establishing a common identity and object for the profession due to the view that the Human and Natural Sciences are opposed, thus representing two modes of scientific practice that do not communicate with each other. However, if there is truth in what Popper says about the possibility of learning from critical and rational discussion between different languages, then the myth dissolves when we recognize that there are multiple epistemologies and, consequently, multiple objects of study concerning the phenomenon of interest in Physical Education. This implies that there are multiple "physical educations" as scientific practice addresses its diversity without disregarding its specificities, which results in different theoretical, methodological, and pedagogical propositions.

The model of Psychokinetics developed by the French scholar Jean Le Boulch in the 1960s represents one of these physical educations, or rather, a possible lexicon from which to address the specificities of the phenomenon of interest to the profession. Le Boulch proposed a "general theory of human movement" based on Biological and Human Sciences, with the aim of linking the domains of scientific theory and pedagogical practice. Through this theory, the author sought to promote the analysis of "motor intelligence", that is, the perception and kinesthetic sensations through which each person's "body schema" is organized, based on the "sensory-motor responses" employed in their actions (Silva; Andrieu; Nóbrega, 2018).

Le Boulch theorizes that Psychokinetics could be the science of human movement, as it focuses on bodily movements and each individual's motor actions as means to promote development and learning. His "expanded" view of the profession stems from his training, which he describes as "essentially technical", oriented towards learning specific "coded gestures", particularly sports techniques. Furthermore, he notes the "inapplicability" of the disciplines studied in a fundamentalist manner (Sociology, Psychology, Anatomy, etc.) to the domain of bodily movement and the specificities of the profession. This led to his interest in developing a theory that starts from, and prioritizes, movement, channeling it towards a global education of the human being (Silva; Andrieu; Nóbrega, 2018).

Le Boulch's propositions impacted the profession in Brazil, particularly during the 1970s and 1980s, especially in Physical Education practiced within the formal education context for children (school-aged), by presenting the possibility of educating through the body and movement. However, the application of his theory led to an approach that restricted Physical Education to a clinical and neurological view of the nervous system and the body's adaptations in learning situations, which guided psychomotricity in the context where the author was situated. Some traces of this approach concern to elements that make up the predominant kinesiological view in Physical Education, such as the emphasis on anatomical-physiological, biomechanical, bioenergetic, and biochemical aspects of human movement (Silva; Andrieu; Nóbrega, 2018).

Part of the criticism directed at professionals linked to Kinesiology fell on Go Tani's theory, especially in the 1980s, as he theorized about Physical Education in

Brazil from this perspective of training, particularly given that one of Go Tani's main concerns is epistemological demarcation. His Kinesiology theory is developed as a model for structuring research, postgraduate education, and professional training in the field, based on the study of human movement with the aim of directing the profession both theoretically and structurally. The author's contributions to the field seek to establish an "epistemological identity" that supports Physical Education as an autonomous science, well-positioned in terms of development and scientific advancement. To achieve this, according to the author's perspective, it is necessary to address the "inter-understanding" of the field, stemming from competing theories or approaches and the beliefs they perpetuate (Reis *et al*., 2022).

From another perspective, the research program proposed by the Spanish scholar José María Cagigal during the 1950s stems from his critique of the exclusivity of "intellectual culture" in formal education. According to the author, the overemphasis on accumulative, methodical, and technical knowledge needed to be countered in schools, in favor of an educational program based on a comprehensive interpretation of the human being. Alternatively, the author proposes a theoretical model grounded in the concept of "physical culture" as a way to refer to human knowledge of the world through the body and to the experience, exploration, and learning about the world through movement (Martines; Fugi; Souza, 2020).

The centrality of physical culture in the educational process of individuals, from Cagigal's perspective, highlights as the object of the scientific field of Physical Education the "moving man", that is, the human being endowed with a body that moves through the world, with biological, psychophysical, motor, and intellectual properties. According to the propositions of this author, human beings have a vital need to move and possess the apparatus for it, so that the "motor act" would be a central element for the profession. This is because it is responsible for the integration between brain stimuli, development of the locomotor system, spatial-temporal schematic formation, proprioceptive complexity and precision, and enhancement of operational, communicational, and social potentialities, including integration and affectivity (Martines; Fugi; Souza, 2020).

The attention to the human being endowed with a body with movement and socialization needs was also a condition for the emergence of the theoretical model proposed by the Portuguese scholar Manuel Sérgio in the 1980s. Under the designation of Science of Human Motricity, this model constitutes a critique of traditionally developed Physical Education, which he considered reductionist and biologicist. In his proposal, the author views human motricity as an intentional action aimed at transcendence, so that Science of Human Motricity seeks to understand not only physical movement but also the involvement of a given action, intentional, with political, ethical, and cultural aspects. For the author, human motricity concerns the "body in action", the body of the person who acts. This implies an understanding of "body awareness", that is, the perception and understanding that each person has a body, and that human movement cannot be dissociated from the human being at all (Sérgio, 1996).

The "body in action" to which Manuel Sérgio refers encompasses physical-biological, psychological, cultural, ethical, aesthetic-creative dimensions, among others involved in the complexity of human movement. With this, the author proposes not only the appreciation of the diversity of experiences, motricities, and epistemologies but also the capacity for transcendence, that is, to surpass conditions and modes of being through human movement. The "intentional movement of transcendence", a key concept in this author's theory, thus relates to the ability to overcome personal limits (physical, mental, emotional) as well as to the elevation of the human being, that is, personal fulfillment in the search for meaning in experiences and life itself (Sérgio, 1996).

In his own way, Valter Bracht's theory for Brazilian Physical Education seems to be driven by a concern with the autonomous meaning of one's own life, understanding Physical Education as a "social practice" that reflects the socio-cultural values of a given historical time and social context. In this sense, the author examines the pedagogical foundations of the field in Brazil and demonstrates how such theories reflect meanings constructed about the body and the human in so-called modern societies. He seeks to problematize the implications of a break with the modern view of the body, that is, the body and the subject as moldable and disciplinable objects to meet capitalist demands. To this end, he works with notions such as "objectification of the body", "corporeal" education, body-mind dualism, and their impacts on education and Physical Education as a pedagogical practice (Bracht, 1999).

The French Pierre Parlebas also draws from the context of formal education in proposing his theory of Motor Praxeology in the 1960s. His theory emerges primarily from concerns about the application of psychological theories with "structuralist" overtones to Physical Education classes, leading him to propose a perspective that integrates theory and practice while avoiding "biologic reductionism". In this sense, "Motor Praxeology" refers to the logic or dynamics of organizing "motor behaviors" and "motor situations", that is, the metacommunicational codes around which "domains of motor action" are organized, characterizing each practice that constitutes the content of Physical Education (Parlebas, 1981, 2020).

Each of these models emerges from conditions that, while unique and specific, share a common recognition of the fragmentation of the field's overall vision, that is, its organization from specific sections or places located within it, on its borders, or even outside it. In response to this perception of fragmentation, their respective proponents propose ways to engage with the phenomenon of interest with broad aspirations. This stems from the understanding that partial views hinder an adequate understanding of Physical Education in its entirety and potential, or paraphrasing Parlebas (1981), in its Gestalt. Hence, the proposition of models that seek to justify the profession in and of itself, aiming to ground it in aspects related to its "internal logic".

The study of these models — but not exclusively these — helps in understanding the movement toward the scientific organization of the field. Each proposed a systematically organized and scientifically grounded approach based on the knowledge that supported the profession in its time and context, with effects that persist today.

These propositions share the very organization and social positioning of Physical Education as a condition of emergence. At the same time, they not only confront peer criticism but, in many cases, incorporate and refute it through what qualifies as scientific discussion and stance. In doing so, they blur the boundaries that delimited the contexts in dispute and shed light on elements conducive to the epistemological debate in the field. They utilize diverse evidence to indicate conjectures through which it became possible to infer and foster the scientific validity of Physical Education, albeit initially circumscribed to the perspective provided by their respective theoretical models.

4 PROVISIONAL FINAL REFERRALS

The identity fragmentation of Physical Education, given the theoretical and conceptual multiplicity that characterizes it, reflects its process of organization as a science applied to human movement. However, the field lacks a framework that supports the understanding of the productivity that this pluralism represents in terms of fostering critical discussion and the construction of scientific knowledge. It is in this sense that I propose, for the course of the study discussed here, a step back to focus on the organization of the field and to resize the theoretical models that contribute to its autonomy, in order to better understand its contexts and paradigms (biological, pedagogical, sports-related, psychological, anthropological).

I recognize the need for a deeper exploration of historical, social, biographical, and conjectural events that underpin and properly expose the issues briefly highlighted in the text. However, I believe that a contextualized and reflective review of the categories (concepts) that make up the various theoretical models structuring Physical Education represents a fruitful starting point. In this sense, given the limitations of this production, I have focused on outlining pathways and understandings through which it is possible to begin studies of greater density and scope regarding the constitution and scientific practice of the field.

I consider that the models and categories highlighted in the study reflect the diversity of ways of thinking, languages, and, most importantly, the contributions of previous scientists aimed at improving scientific practice in the field and advancing the construction of knowledge regarding our phenomenon of interest. Thus, among the prominent provocations of the study, it is pertinent to revisit two questions to stimulate discussion on the focused topic: to what extent do the “subfields” of Physical Education understand and appreciate each other’s scientific approaches and methodologies, and how do they converge to the scientific development of the field in a critical and respectful manner toward the different paradigms around which these approaches are organized?

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Resumo: O artigo apresenta reflexões que fomentam o debate acerca da epistemologia da Educação Física. Para isso, verte-se à resposta da seguinte questão: o que qualifica o conhecimento científico e que modelos teóricos ajudam a compreender a organização científica da Educação Física? O delineamento da resposta possível se dá a partir do diálogo teórico-conceitual com as metateorias de Karl Popper e Thomas Kuhn, bem como com teorias de autores da Educação Física cujos modelos propostos contribuem para elucidar questões afetas ao assunto. Ao acionar categorias que colocam em perspectiva a postura científica, o texto evidencia elementos fundantes da organização de campos e sistemas de conhecimento. Especificamente em relação ao campo da Educação Física, problematiza o mito do contexto e a diversidade lexical decorrente dos modelos propostos, convidando ao conhecimento das múltiplas epistemologias que o constituem.

Palavras-chave: Epistemologia. Educação Física. Ciência. Movimento.

Resumen: El artículo plantea reflexiones que fomentan el debate acerca de la epistemología de la Educación Física. Para ello, se trata de responder a la siguiente pregunta la siguiente pregunta: ¿qué califica el conocimiento científico y qué modelos teóricos ayudan a comprender la organización científica de la Educación Física? El delineamiento de la respuesta posible se base en el diálogo teórico-conceptual con las metateorías de Karl Popper y Thomas Kuhn, así como con teorías de autores de la Educación Física cuyos modelos propuestos contribuyen a dilucidar cuestiones relacionadas con el tema. Mediante el uso de categorías que colocan en perspectiva la postura científica, el texto evidencia elementos fundantes de la organización de campos y sistemas de conocimiento. Específicamente en relación con el campo de la Educación Física, problematiza el mito del contexto y la diversidad léxica derivada de los modelos propuestos, invitando al conocimiento de las múltiples epistemologías que lo constituyen.

Palabras clave: Epistemología. Educación Física. Ciencia. Movimiento.

CONFLICT OF INTERESTS

The author declares that this work involves no conflict of interest.

AUTHOR CONTRIBUTIONS

João Paulo Marques: Comprehensive development of the work.

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