

Semantic gaps in the theory and the practice of physical and sports education in the Italian context

Pietro Luigi Invernizzi

Raffaele Scurati

Gabriele Signorini

Franco Mauro

Marta Rigon

Francesca D'Elia

Gaetano Raiola

Abstract

Nowadays, we face a profound fragmentation of knowledge, which is addressed in distinctive ways, conforming to the specifics of each field of knowledge and having a specific lexicon and ways to interpret reality. To better understand and communicate the complexity of the reality of motor and sports sciences in Italy, it is necessary to study its ontology based on a holistic and comprehensive approach such as System Thinking (ST). So, this preliminary review aimed to verify the coherence of terminology used by Italian academics (who study methodologies related to teaching) and practical communities (who live the reality of daily teaching) in motor and sports sciences, specifically regarding the didactic of physical and sports education. For this purpose, according to Design Based Research (DBR), a first investigation of the interpretative semantics of the discipline's specific terms was accomplished with the support of multiple sources of information such as documents, databases, and brainstorming performed by experts (representing the guiding team and stakeholders from all considered communities). Moreover, the frequency of some terms and keywords considered in European (ERC) and Italian (CUN) legislation was assessed to contextualize better the impact of common practice community keywords on the scientific and regulatory community. Successively, the studies that analyzed the terms from 2000 to 2020 in the leading scientific search engines (SCOPUS and Web of Science) were also investigated. Results indicate that in the CUN and ERC areas, there is a total absence of the most relevant lemma to the community of practice. Furthermore, significant terms such as play, sports education, psychomotricity, and gymnastics are less considered or unconsidered in the specific scientific and didactic fields. Possible solutions for a specific semantic model to reduce the gap are finally hypothesized and presented.

Premise

A new semantic concept of physical education and sport as means of an integrative approach between theory and practice (design of the preliminary research).

The preliminary research presented in this paper is based on design-based research (DBR) (Easterday et al., 2014). It integrates eight phases of analysis (focus, understand, aims definitions, conceive a plan,

preliminary evidence, design - evaluation and improvement, future investigation, summary) to draw attention to physical education's semantics with the aim of highlighting possible language gaps in practice and research applied to physical and sports education.

Keywords

Semantic knowledge, syntax, teaching, etymological identity, academic community, community of practice; integration of knowledge; normative etymology; design-based research

Introduction

Phase 1 – Focus on topics: the multilevel socio-ecological model and the system thinking applied to physical and sports education.

The cultural scenario inherited from the past and that we face today is sometimes characterized by a fragmentation of knowledge (Harland, Kieser, & Meldrum, 2006; Hastings & Larsen, 2021), where each piece of knowledge addresses reality in its specific determinate way, with its specific lexicon and its specific way of posing itself in the interpretation of knowledge. Conversely, a culture that cares for human formation should address the whole context system to understand the complexity of the interaction between educational processes. In this sense, physical and sports education can be interpreted as a tool that encourages one to look at the bigger picture (Osberg, 2005; Sanford, Hopper, & Starr, 2015) (Figure 1).

From this point of view, the socio-ecological multilevel model based on a system thinking (ST) approach (WHO Regional Office for Europe, 2022) represents a current model of scientific interpretation of reality that encourages looking at all factors (type of communities involved, policy, specific characteristics of context) that can impact on a specific considered system. In this case, the system could be represented by educational research related to physical and sports education (Bronfenbrenner, 1977; Schölmerich & Kawachi, 2016; Whitehead, 2010). From this perspective, the idea of fragmentation of reality is no longer

conceivable to understand the value of comprehensive educational research based on integrated information, where the body and movement have a central and recognized value in acquiring a conscious experience of the world (Seth, 2013; Seth & Tsakiris, 2018).

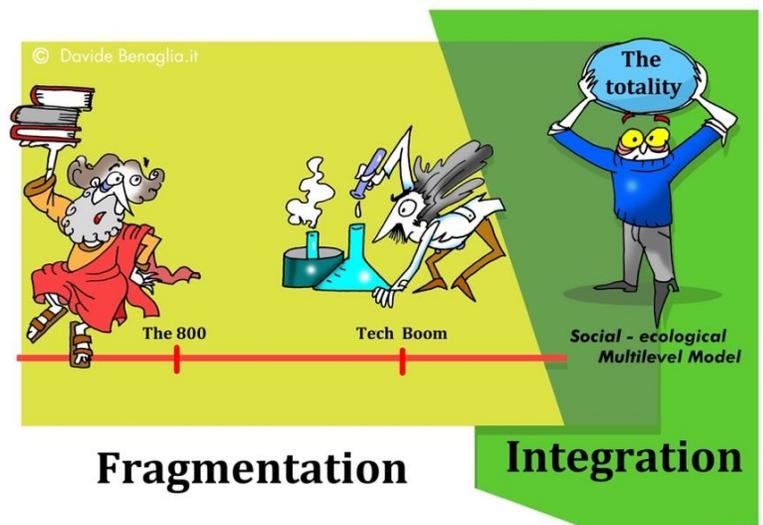


Figure 1. Timeline related to an outdated fragmentation model and an actual socio-ecological multilevel model based on system thinking (ST) as a current way of interpreting the complexity of the educational learning process.

Phase 2 – Understanding: Material ontology and community of practice.

To better understand and communicate the complexity of the reality of motor and sports sciences, a study of its ontology is necessary. Furthermore, the importance of ontologies is recognized in numerous fields of disciplinary research, including educational and formative

contexts in general (Galliani, Petrucco, & Dal Bon, 2004).

Starting from the general philosophical definition of ontology as a general view of reality (Varzi, 2005), it is possible to move toward an applied material ontology of a descriptive and hermeneutic (interpretative) type proper to the human and social sciences. In these specific collocations into the scientific reality related to teaching, learning is conceived as an intra-community social/relational act (Wenger, 2006) where multiple contexts have a complementary representation and an alternative value (Lave, 1988). To neglect the community of practice means to miss all the richness of reflective intentionality nuance typical of storytelling and inherent in physical education learning (Bruner, 1996; Standal & Moe, 2013).

Understanding: Practical experience as a means of semantic interpretations of physical and sport education words.

To better analyze the ontological plan of physical and sports education, examining the scope of semantics that characterizes the discipline is necessary. The conception of culture as the best-integrated interpretation of the world and reality is linked to the information concept. In a different context, the same word denotes different notions and concepts (LaBar & Cabeza, 2006; Loprinzi, Frith, & Edwards, 2019). Every term is rich in information, but deciphering it requires a mind that can understand it, a shared history, and a connection of lived experiences. Only with these premises can a term be generalized to a community, and its interpretation can be well defined. Thus, the semantics closely related to the terms' meaning are the cognitive and experiential basis for a better understanding of what one wants to

express (Boleda, 2020). However, consistent and competent use of the correct syntax of words (choice of use and combination) is required when it is necessary to communicate and transmit meanings relating to experience, knowledge, and expertise.

The use of syntax has inherent limitations. This means of transmission limits the complexity of the physical education's discipline so closely linked to personal experience. The interaction of emotions, feelings, and knowledge related to one's experience creates a complex network of meanings that words often fail to convey totally. Therefore, using appropriate terminology and a common language among experts in the field is necessary to better share knowledge and individual and subjective lived experience (Cattaruzza, 2008; Marrone, 2001; Tulving & Bower, 1974). Awareness about the value of practical experience and integrated information, based on the common and shared use attributed to the meaning of words, are the key elements to reduce the semantic gaps between the theory and the practice of physical and sport education (Fedorenko, Blank, Siegelman, & Mineroff, 2020; Siedentop & Tannehill, 2000).

Understanding: The normative terminology of the academic community and its links to the community of practice

The Italian Academic scientific organization is based on normative containers and scientific disciplinary sectors, which are titled and declined in individual fields of knowledge. On the contrary, in the European Union and the international community, the academic organization is based on a system of official keywords and concepts (419) spread across three scientific areas and twenty-seven

research areas, according to the European Research Council (ERC) system, which is the inevitable framework from which individual lines of research derive. Italy must align itself with the international framework because that is one of the objectives to be achieved to become a full member of the European Union, not least because of the huge financial resources allocated. At first sight, the difference between the two classification models is quite apparent: on the one hand, the Italian system is characterized by a rigid declination of scientific knowledge to which researchers must adhere scrupulously (otherwise the lines of personal research will be incoherent with those of official research); on the other hand, the European system is based on a semi-free system which declines equal but general knowledge, aimed at grafting individual lines of research in order to encourage interdisciplinarity (D'Isanto, 2019).

Common links could be found, deepening the connection between these two apparently opposite systems. Before going into the links, it is appropriate to describe the state of the art and the prospects for alignment, which, for epistemological clarification (syntax and semantics) of the key and broad concept of physical (motor) and sports education, it is essential to highlight.

In Italy, a disciplinary scientific declaratory of Motor and Sport Sciences is being developed by CUN (the Italian National University Council) that better declines the contents in aggregated and disaggregated form by disciplinary knowledge distinguished into motor activities and sport activities, the so-called disciplinary scientific sectors (D.M. 30/10 n. 855, 2015).

As an aggregate form, it develops scientific topics related to movement and sports fields (Figure 2). In disaggregate form, these

topics are divided and specifically addressed to one of the two areas (movement and sports fields).

In this “state of the art” analysis, we highlight the preservation of the Italian descriptive model of the organization of scientific academic knowledge that, in 2016, had declined 2,400 keywords. These keywords are relevant to the Italian motor and sport sciences, which at the time aimed at establishing a “flexible link” with the ERC references. The areas listed below are derived from the keywords mentioned above and can be referred to in aggregate and disaggregated forms: training; learning; wellness; didactics of motor and sports activities; fitness and wellness medicine; sport pedagogy; sports performance; exercise and sports sciences; motor development. In Europe, the research institution annually draws up panels and sub-panels within the three scientific areas (physical and engineering sciences, humanities and life sciences, and social sciences), which are assimilated with Italian research fields, keywords, and topics. The latest ERC update of 2021-22, among the 419 sub-panels, presents fields in which motor and sport sciences can be included (European Research Council, 2020).

Figure 2 highlights relationships between the terminology used by the academic (ERC and CUN terms) and practical communities (terms commonly known and used by PE teachers, whose choice will be clarified in the following paragraphs).

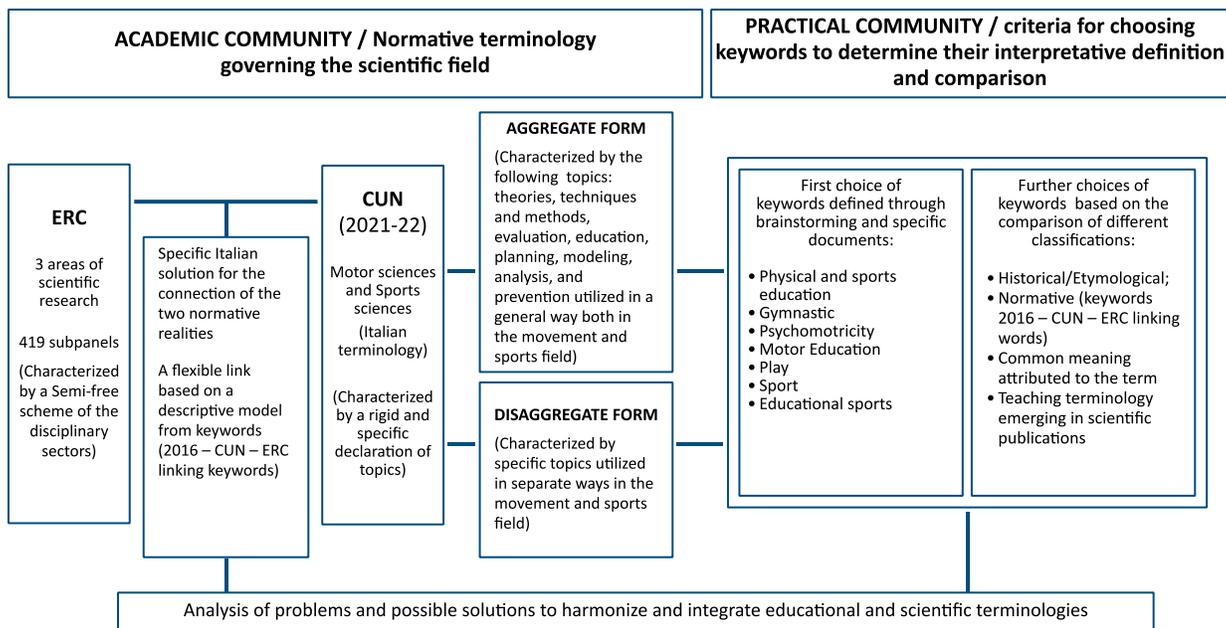


Figure 2. Integrations of key terms analyzed as a function of educational and scientific terminology (Building bridges)

Phase 3 – Building aims and hypothesis: Identity of etymology as the conjunction between new and continuous scientific discoveries and their applicability by the practical community.

Using a specific language in motor and sports science allows the creation of a characterizing identity culture and the transmission of ideas, thoughts, and reflections inherent in the subject matter most clearly and inclusively possible (Norton & Toohey, 2011).

A terminology based only on a single scientific domain is insufficient to develop an identity language. Therefore, it becomes necessary to consider a vocabulary that includes subjective interpretation from the experience of the direct users of that specific practical application language. Following design-based research (DBR) purposes, creating a solid bridge between theory and practice is necessary.

Commune etymological identity represents the basis for close communication between all the stakeholders involved in the physical education field (practical, scientific, and normative integration) (Vaezi, Moonaghi, & Golbaf, 2019).

According to the DBR, this process should be guided by a defined research design. With this purpose, the first aim (first step) of this preliminary study is to verify if the normative/scientific terminology of the academic (national and international) community that relates to other stakeholders and specific terminological references is consistent with the terminology of the practical community and applied field. The hypothesis is that, in relation to the type of classification considered, there may be different types of terms chosen or definitions of the system of thought used and the meaning attributed to the terms.

The second aim of the study (second step) is to understand how much and at what "depth" in terms of the number of studies, the terminologies attributed to the community of practice are considered in the normative and

scientific field. The hypothesis is that the scientific community has not attributed many studies to the educational and formative terms considered fundamental for the community of practice.

Methods

Phase 4 – Conceive a plan.

The rationale of the present investigation is synthesized in Figure 3, which describes the fundamental stages of the protocol concept and relative connections.

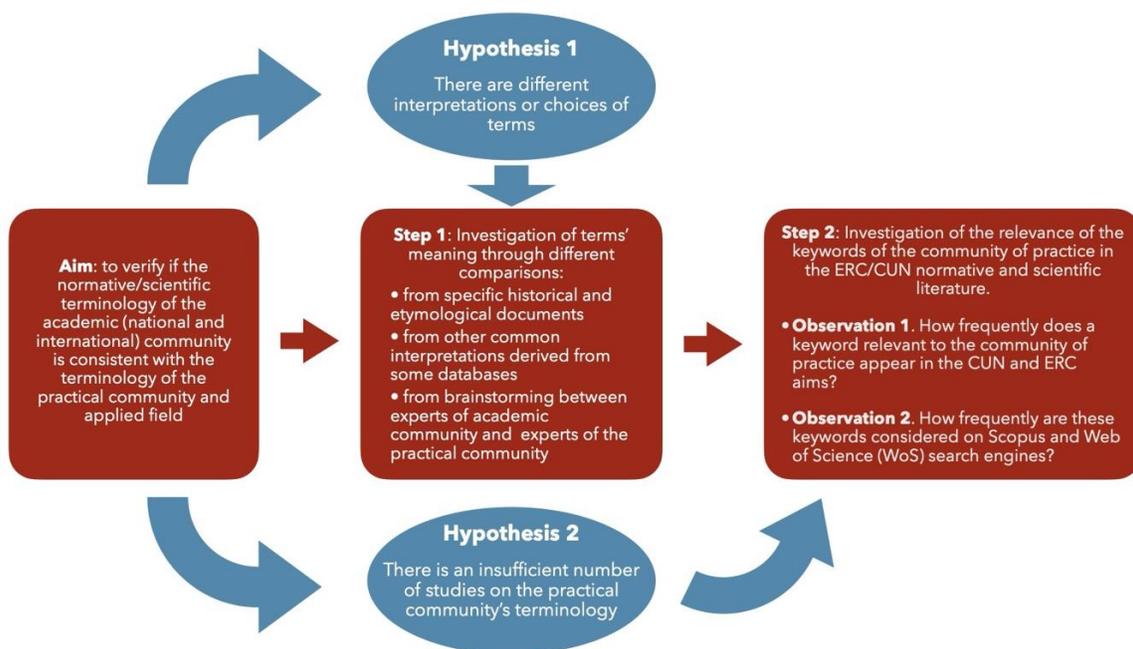


Figure 3. Rationale of the study protocol.

The study's rationale aimed to solve the practical problem of identifying a common and flexible research language based on practical experience. To reach this purpose, according to DBR principles, it is necessary to involve multiple actors and sources of information as described in the following steps (Herrington, Reeves, & Oliver, 2014).

Conceive a plan: Terminological definition analysis (step 1)

The application phases of this terminological definition analysis emerged as brainstorming considering a guiding team (Vaezi et al., 2019) composed of academic experts (five associated professors and a researcher in the Faculty of PE and sport) and practical communities (five teachers of PE having at least ten years of experience in public schools) of PE and motor science, and consulting specific terms in some specific documents and database study

following a historical, etymological, normative, scientific, public cultural diffusion route (Beyer, 1992; Haag, Mess, Haag, & von Johannes Hanke, 2012; Mumford, 2021). Historical references have been of particular relevance.

Indeed, many historical documents have been consulted during this step, as they represent the common "root" of the etymology and the community of practice (Boni, 1962; Di Donato, 1984; Frasca, 1979; Grifi, 1989; Ulmann, 1968; Valletti, 1893).

A procedural way based on a sequential structure better clarifies the conceived material ontological plan (Figure 4).

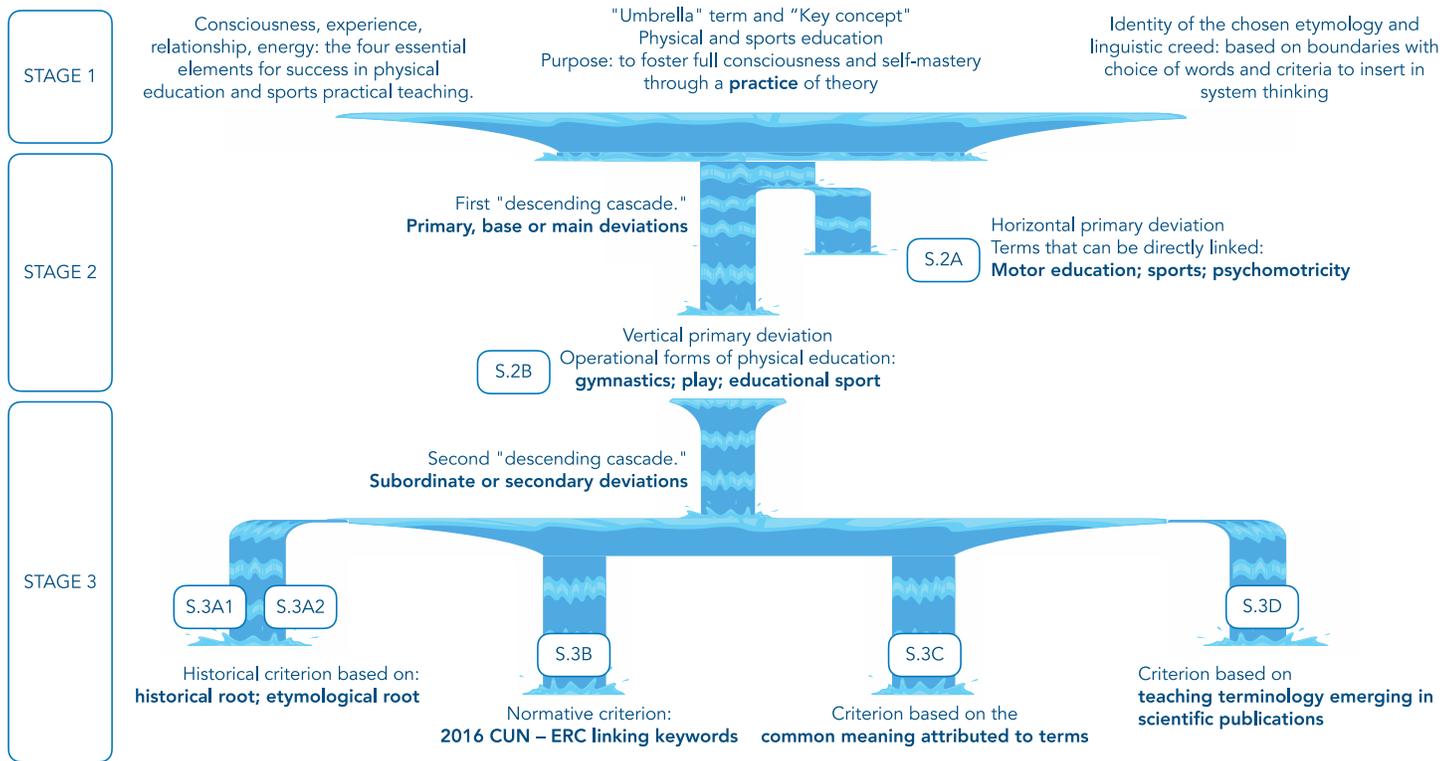


Figure 4. Procedural construction of the ontological reference plan for physical and sport education. Details of each stage are provided in Appendix I.

The specific stages of the sequential development (tools and actions chosen) are realized based on these three points:

I. Choice of paradigm of reference: The boundaries of etymology are not clear-cut, and the motivation for choosing a term must be addressed to its meaning and the interpretative ideas that emerge from the experience of the practical community (Leontiev, 2013; Pennebaker, Mehl, & Niederhoffer, 2003). In particular, the choice is addressed to the terms physical education, sport, sports education, play, psychomotricity, gymnastic and motor education, which represent operational form that teachers of PE use with their experience, consciousness, energy and relationship capacity in order to educate, to form and to transmit the

basic skills of physical literacy (Buccino, Colagè, Gobbi, & Bonaccorso, 2016; Snowden, Griffiths, & Neary, 1995). Motor science is not used in this choice as it is considered an improper term used in ministerial school normative to define physical education (Brainstorming outcome). The choice of the term physical and sports education (where education is the peculiar element) is determined by empirical experience as physical and sports education teachers in school settings and by the field of research/study related to didactics and educational research (Buccino et al., 2016; Snowden et al., 1995). Consciousness and self-mastery, goals of physical education and sports, are the foundation that connects the operational plan of reference to the theoretical plan based on a holistic paradigm. Semantics is based on the meaning we attribute to words representing the true ontology in which the affective-emotional-experiential component allows us to attribute warmth to terminological interpretation. In this

paper, therefore, we want to avoid a sterile, aseptic, obscure, and empty copy of various hyper-specialized terminological labels, risking neglecting the fullness of meaning due to a fragmentation that oppresses the interactions and relationships of a complex and multidimensional system (Harland et al., 2006; Hastings & Larsen, 2021).

II. A vision of a practice of theory: A theoretical culture based on the scientific foundations of physical and sports education (disciplines such as physiology, anatomy, psychology, sociology, pedagogy, and biomechanics) is the knowledge of a theoretical framework not directly applicable to practice. No physiologist, pedagogue, anatomist, or general education expert can apply his or her science to jumping leap forward, learning to dunk, or any other motor/sport skill (Stenhouse, 1983). The practical synthesis of these theories through a transdisciplinary approach becomes a culture (specific practical didactics) when it can be directly applied to the solution of a problematic learning or training situation in an applied field of education or health (Lier, 2010) (Figure 5).

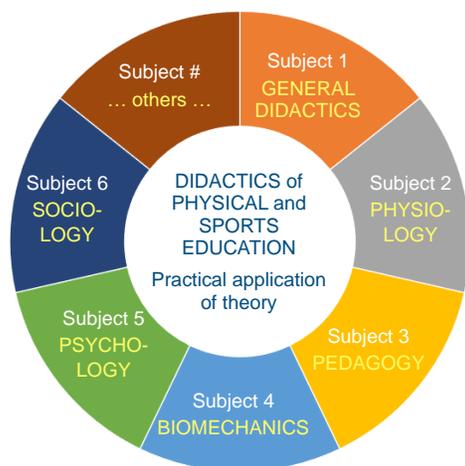


Figure 5. Transdisciplinary convergence of a theory of practice into a practice of theory (brainstorming outcomes).

III. Preliminary explorative terminological analysis: A preliminary terminological analysis of the most representative terms included in Figure 4 based on the ST approach (Cavana & Clifford, 2006; WHO Regional Office for Europe, 2022) was conducted by brainstorming among experts from the academic and practical physical education community. Terms of stages 1 and 2 emerged as priorities. The analysis of stage 3 further highlighted different term classifications following the origin of documents and studies on historical, etymological, normative, scientific, and public cultural paths. Appendix I provides full details of the brainstorming and document analysis results.

Conceive a plan: Number of studies in the normative/scientific field that consider the terms relevant to the community of practice (step 2)

This second phase is based on two observations, constituting a preliminary analysis, which should be oriented toward further investigation and verification through a systematic literature review.

Observation 1. The first observation investigates how frequently a keyword relevant to our study appears in the CUN and ERC aims. Specifically, the following terms related to the community of practice and terms related to the academic community have been considered and compared:

I. Terms related to the community of practice: PE, sports education, play, gymnastics, motor education, psychomotricity, sport.

II. Terms related to the research community (2016 CUN – ERC linking keywords) are classified into three pillars:

- Educative pillar: teaching motor activities, teaching sports activities, learning, and motor development.
- Sports pillar: training, performance, sport pedagogy, sports science
- Health pillar: wellness, fitness, wellness medicine, exercise science.

Observation 2. The second observation investigates the Key terms retrieved on Scopus and Web of Science (WoS) search engines.

This analysis in the preliminary form of the studies was conducted by analyzing the frequencies of the key terms in the research conducted from 2000 to 2020 (trend by range of every five years).

The search was performed on abstracts, keywords, and titles as references related to:

- a comparison of the general Health, Education, and Sports areas.
- an analysis of the most frequent and relevant words related to the community of practice (selected by brainstorming) and Italian normative keywords (2016 CUN-ERC).
- a comparison of the most frequent and relevant words occurring in the specific education research (selected by brainstorming).

Results

Phase 5 – Build preliminary evidence: First step of investigation.

The preliminary explorative etymological observation (Figure 4, Appendix I) highlighted the following problem identification:

- It is evident that many terms (psychomotricity, gymnastics, play, sports education, motor education, PE) considered fundamental for the community of practice do not find a direct expression and reference in the terms most used

by the academic/scientific community and normative requirements.

- In etymological and historical analysis, specific terms related to the community of practice (sport, game/play, sports education, PE, gymnastics, psychomotricity, motor education) often presented ambiguous, confused, and overlapped semantic interpretations which are also indirectly reflected in the most accessible information source by non-academic and non-specialized people. As highlighted in the conceptual synthesis of Figure 6 (and Appendix I), terminology related to the community of practice represents an evolution of the historical stages that have characterized it and conditioned the etymological root of the different terms (Ulmann, 1968).

Even the popular terminology derives from the terminology of the community of practice that constitutes a simplified derivation of it (Figure 6). This way, further investigation involving the community of practice and other non-specialist communities is considered indispensable to verify the interpretative coherence of the different terms.

The scientific-cultural terminology should constitute a reference for further evolution of semantics, strictly inherent to the meaning attributed to the words used by the community of practice (Haff, 2010). Circularly, the terminology of the community of practice should be the reference for the orientation of scientific study, which in turn forms the basis for policy decisions on current legislation regarding both national and international scientific regulations and ministerial educational programs on physical education (Willimczik, 1992).

This way, according to the ST approach (Cavana & Clifford, 2006; WHO Regional Office for Europe, 2022), Figure 6 represents an attempt to highlight the links between the different factors by identifying the "leverage

points" (the point of the system by acting on which the most remarkable changes can be determined) that could be found in the normative terminology. As a practical example, the Italian educational normative (Ministerial Scholastic Guidelines) uses the term motor science improperly to indicate the terms physical and motor education, which are more coherent with what is used by the community of practice. This lack of coherence in terminology used by different stakeholders is amplified by a circular reinforcement - negative reinforcing loop - caused by more problematic linkage issues of the scientific area - resistance point as the point of system that creates a resistance to the change of status - with the practical community's educative/applicative needs - terminology mainly pedagogical-didactic in the normative area; mainly neuro-psycho-physiological in the scientific area; mainly operational in the community of practice - (Ennis, 2011; Wandersman, 2003). Figure 6 identifies possible future investigations and hypotheses of solutions on leverage and resistance points, which will be clarified in the discussion.

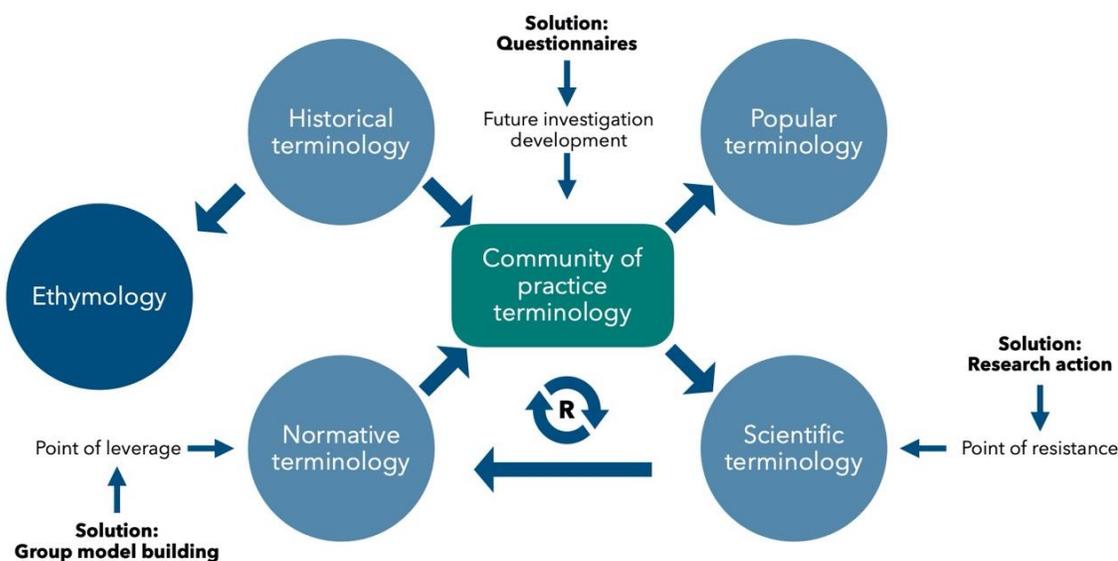


Figure 6. A causal loop diagram of ST: definition attempt of links of terminologies identifying the intervention points, referring to Appendix I. R= reinforcing loop.

Build preliminary evidence: Second step of investigation (referred to online databases)

Figures 7 to 12 show the main relative results of the two observations that constitute the second step of the investigation.

The first observation investigated how frequently a keyword relevant to the community of practice appears in the CUN and ERC aims. Figure 7 highlights the number of times the keyword appears in the normative document directly or indirectly linked to the field of exercise and sports sciences (coherence) and the total time the keyword appears in the normative document (total). Raw frequencies expressed are indicated on the right side of the graph (e.g., $3/14 = \text{coherence/total}$). Graphs do not show terms missing in CUN and ERC.

The second observation investigated the Key terms retrieved on Scopus and WoS search engines.

The search by the general terms of sport, education, and health in the primary scientific search engines and their global trend from 2000 to 2020 are shown in Figures 8, 9, and Table 1. The number of studies addressed to general health differs from studies addressed to the

educational/pedagogical sphere, and both differ from studies addressed to the sports sphere with

a range of differences that has continued to increase over the years.

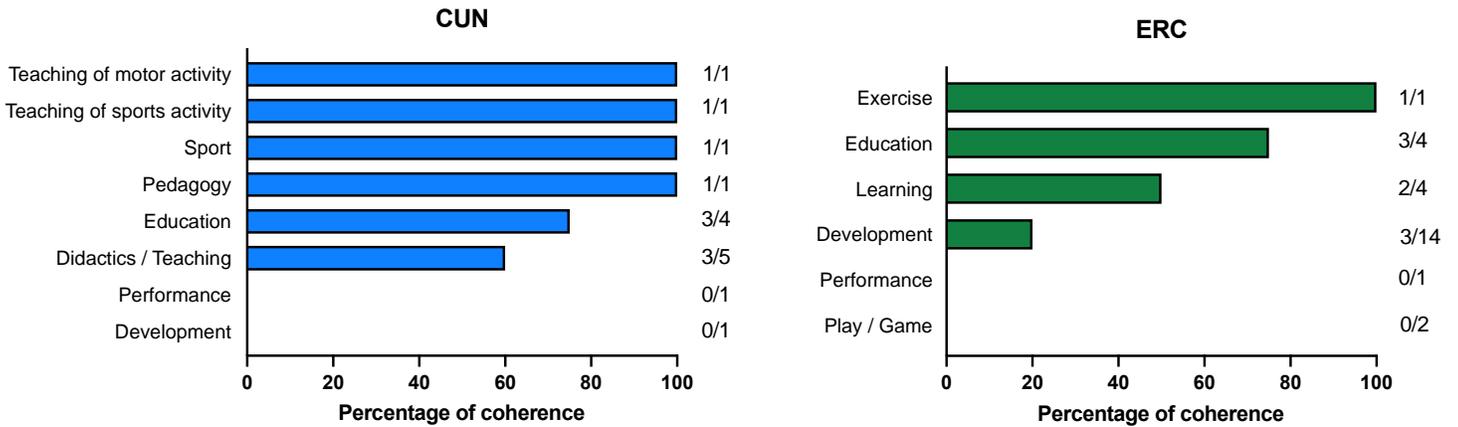


Figure 7. Percentage of coherence refers to the keywords under investigation compared with the total times the term is used in the considered national (CUN) and international (ERC) normative.

Overall Searches (Scopus & WoS - 2000 to 2020)

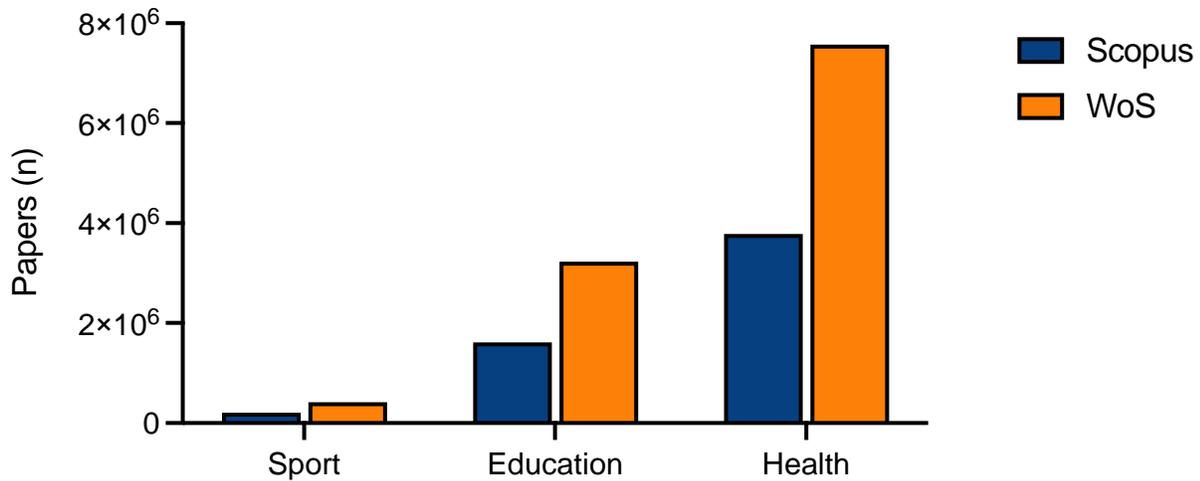


Figure 8. Number of records returned from Scopus and WoS searches with Sport, Education, and Health as keywords.

Trend of occurrences Health, Education, and Sport pillars

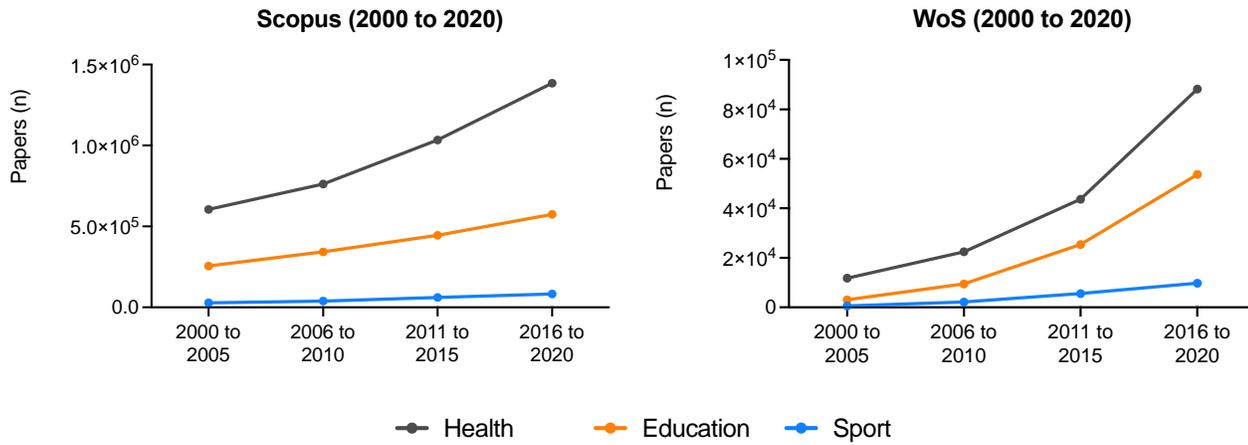


Figure 9. Trends by range years of papers in Health, Education, and Sport general areas in Scopus and WoS.

Table 1: Trends of delta referred to different range years of papers in Health, Education, and Sport general areas in Scopus and WoS

	2000-2005 / 2006-2010	2006-2010 / 2011-2015	2011-2015 / 2016-2020
<i>Scopus</i>			
Sport	10730	21878	21340
Education	87284	101646	130043
Health	157488	272659	350732
<i>Web of Science</i>			
Sport	1522	3442	4174
Education	6439	15921	28287
Health	10665	21196	44596

Values represent the number of studies between the range years (Delta n)

In the context of the second observation, a subsequent investigation was conducted by analyzing the frequencies of the specific keywords of the community of practice and academic community (2016 CUN – ERC linking keywords) in the research conducted from 2000

to 2020. The terms motor education and motor science are completely absent. Furthermore, the terms play, psychomotricity, sport pedagogy, sports education, and gymnastics highlight a marginal number of studies compared to other terms such as physical education, performance, fitness,

motor development, training, learning, and sports science. These analyses could generate a new consideration to verify that there is a need to increase studies that deal more directly with some operational application forms of practical community (Figure 10, search by key terms).

Papers by subject (Scopus & WoS - 2000 to 2020)

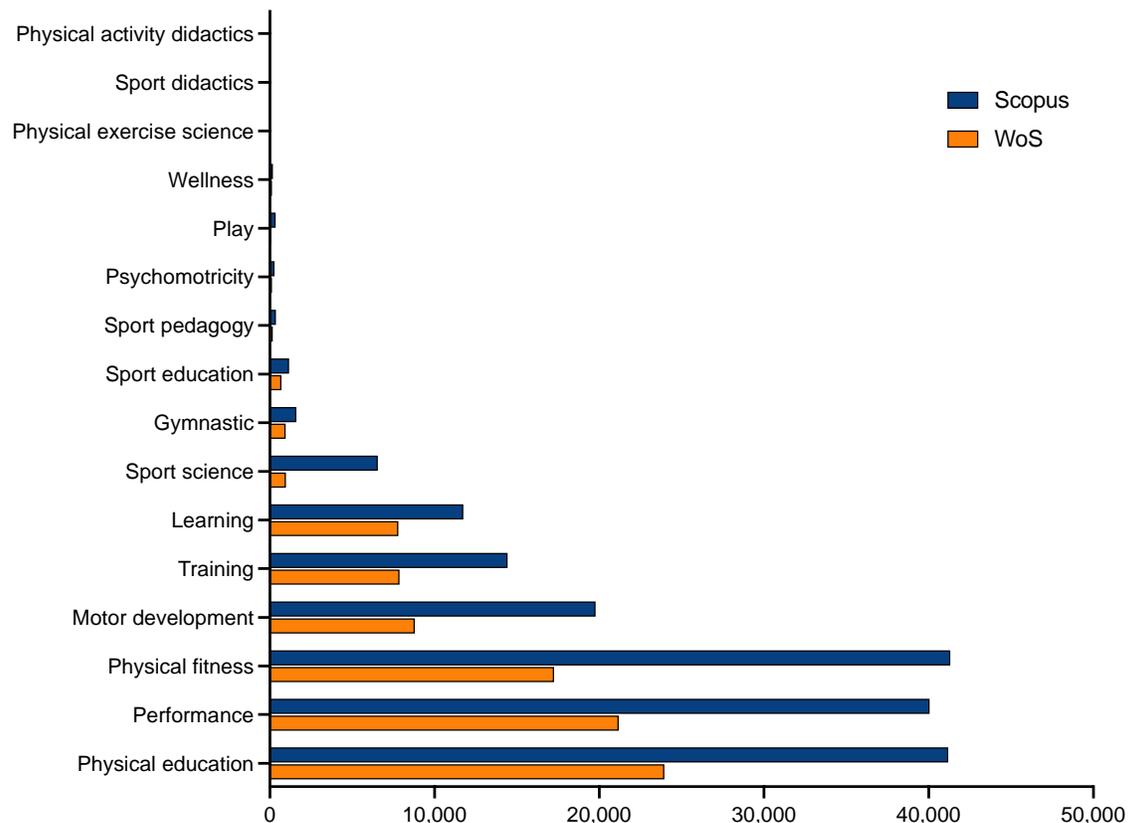


Figure 10. Outcomes of search by keywords on Scopus and WoS (the terms have been selected as representative of the community of practice and related to the 2016 CUN – ERC linking keywords).

In scientific educational research, the terms motor competence, physical literacy, and perceived motor competence are less considered in the specific fields of learning and didactic of physical education and sports education (Figure 12).

The following investigations present the analysis relating to the comparison between the “umbrella terms” (Figure 4) physical education, sport education, and sport pedagogy (assimilable to sport education) in the research conducted from 2000 to 2020 (every five years) and the frequencies of the specific key terms that appear relevant in specific educational research (defined by brainstorming).

Specifically, the terms sport education and sport pedagogy are marginally present compared to the term physical education (Figures 11, Table 2).

Trend of occurrences for Physical Education, Sport Education, and Sport Pedagogy terms

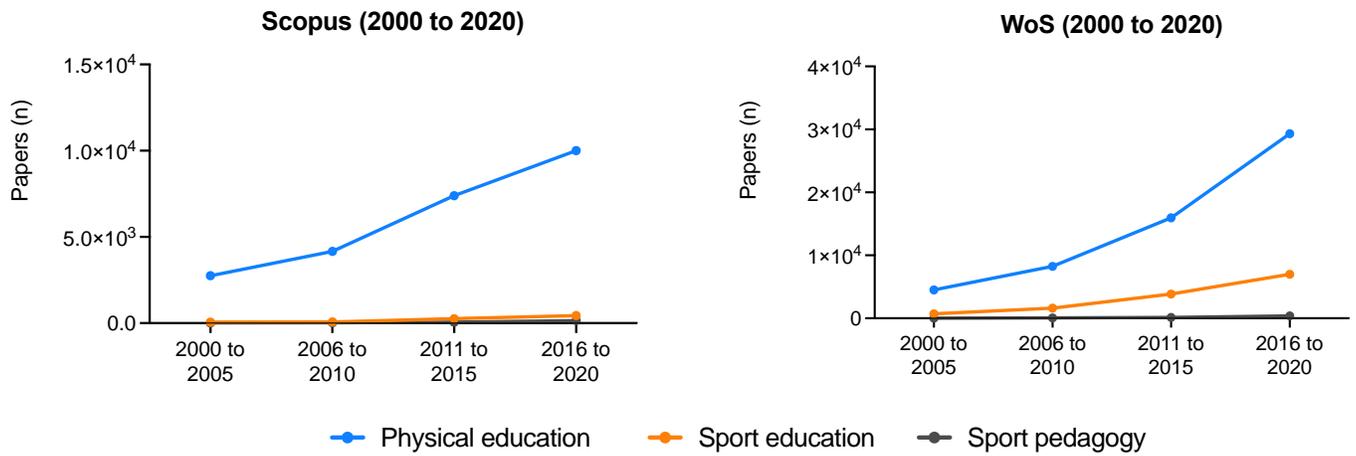


Figure 11. Trend analysis of the terms Physical Education, Sport Education and Sport Pedagogy in Scopus and WoS.

Table 2: Trends of delta referred to different range years of papers in physical education, sport education and sport pedagogy in Scopus and WoS.

	2000-2005 / 2006-2010	2006-2010 / 2011-2015	2011-2015 / 2016-2020
<i>Scopus</i>			
Physical education	1416	3228	2609
Sport education	10	193	174
Sport pedagogy	8	37	91
<i>Web of Science</i>			
Physical education	3738	7704	13373
Sport education	898	2238	3121
Sport pedagogy	35	82	245

Values represent the number of studies between the range years (Delta n)

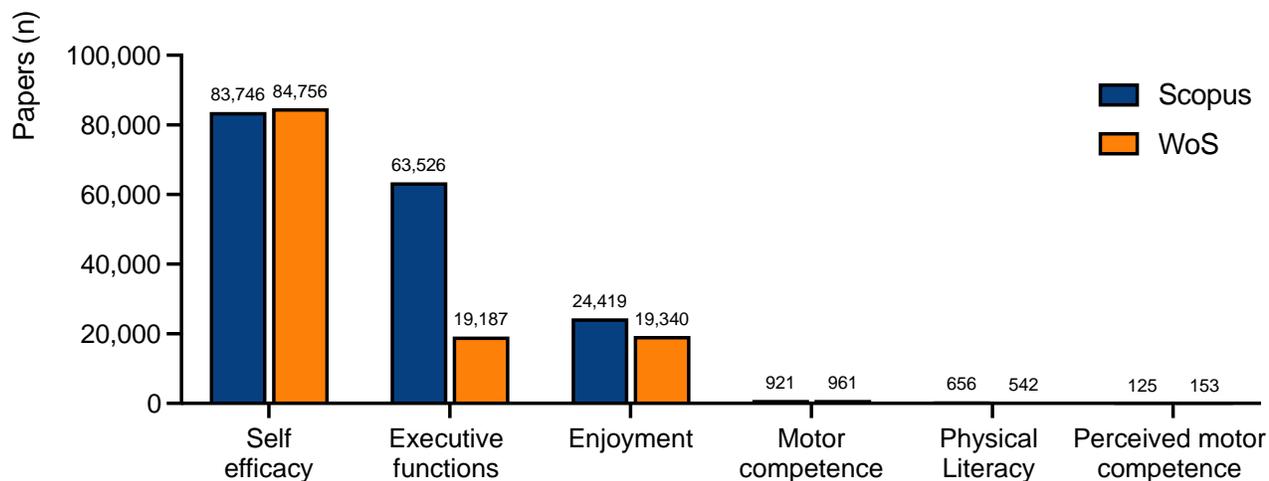


Figure 12. Other keywords considered relevant (brainstorming) in specific educational research in addition to 2016 CUN-ERC linking keywords and to the key terms representative of the community of practice (Scopus and WoS; 2000 to 2020).

Discussion

Phase 6 – Evaluation and improvement of design with solutions proposal

Regarding the first step of the investigation, considering the terms' etymological roots and their historical origin or the common meaning attributed to them, the analysis shows that semantic intrusions are evident for many terms. For example (Appendix I), the term sport, historically and etymologically, invades the term game/entertainment (abbreviation of the English word *disport* that derives from the French word *desport*, which in turn means fun. Even today, the Olympic Games start with an opening match and the beginning of many sport with a party, a conjunction between sport and entertainment) (Grion & Bernard, 2021). Again, in Italian culture, the word game can be historically considered as an interpretative form of gymnastics based on competition (Baumann, 1907).

A solution to solve this confusion is highlighted in Figure 6 and in the future outlook paragraph (Phase 7 – Future investigations), where a questionnaire (Appendix II) to be administered to specialists (physical education teachers) and generalists (other comparison populations) is proposed. It could help to define better the cultural identity of physical and sports education in Italian reality.

A comparison with the normative criteria of the didactic/scholastic pillar and scientific criteria related to the educational-methodological field, shows how, in these areas, the most used key terms differ from those of the community of practice of PE teachers and are more directed to terminologies related to a pedagogical field such as didactics, teaching, motor development, physical literacy, competence, executive functions, self-efficacy, and enjoyment. These considerations are confirmed in the subsequent analyses (second step of investigation).

This way, in the preliminary examination (Figure 7) considering the terms relevant to the community of PE teachers in the normative/scientific field (first observation of second step of investigation), it is highlighted that in the CUN and ERC areas the most relevant lemmas to the community of practice in the composed form are missing (e.g., sports

education or physical education). Moreover, several terms that consider only a term in its decomposed form (e.g., learning, play, game, performance, or education) are not always pertinent to the physical and sports education area (Porretta, Nesbitt, & Labanowich, 1993).

A question that arises spontaneously from the overall observations is understanding how many academics have had a practical path connected to physical education and sports disciplines in their curriculum instead of learning and formative experiences based purely on a theoretical approach. Curricular differences or similitudes could constitute possible difficulties or advantages when changes are proposed to solve practical problems in physical education (WHO Regional Office for Europe, 2022).

It is fundamental to identify the hypothesized action solutions in the leverage point and the resistance point (Cavana & Clifford, 2006; WHO Regional Office for Europe, 2022), as, in this design-based research (Dolmans & Tigelaar, 2012), we are considering the semantics of the complex system of physical and sports education to try to solve problems that emerged in the previous analyses with an ST approach (Figure 6).

In the considered system, for the leverage point, an intervention hypothesis is represented by the collaboration between stakeholders representing a group building model to act with a proper semantic terminology on the specific scientific normative. Category associations, sports organizations, PE teacher organizations, and academic representatives must constitute the mixed group model building (Siokou, Morgan, & Shiell, 2014) that, facing the political community, could determine a more coherent and adequate use of the educative research terminology. Group model building can compare different points of view and develop common solutions favouring the most

appropriate interpretative synergies between theories, practice, and research. They also represent an opportunity to develop consensus regarding the goal to achieve through the ST approach (Bérard, 2010).

Conversely, different interests or a lack of a common language between stakeholders could represent resistance to changes. One of the main problems of educational research is a different priority of researchers compared to that of the practical community (Dede, 2005). Researchers are often more oriented towards data collection and analysis rather than solving concrete problems of practical reality (Dede, 2005). Hence, to avoid the system's resistance to the change (Figure 6), it could be useful to standardize the terminology used and the research conducted by the academic community with the needs of the practical community (Dede, 2005; Dolmans & Tigelaar, 2012). In this vision, the academic community should be oriented to research action (Cohen, Manion, & Morrison, 2017; McAteer, 2013) aiming to solve the practical community's daily concrete educative and didactic-methodologic problems.

More specific characterization of the terminology increases the communication efficacy between the stakeholders involved, improving the consciousness about the meanings of the terminology used (Cavana & Clifford, 2006; Kang, Nembhard, Ghahramani, & Curry, 2018). The process necessary to integrate theory, practice, and research within the specific ontology proper to physical and sports education, which is expressed in this article, is schematized in Figure 13.

This way, a close chain of the proposed interventions hypothesis determining the feedback loop includes the concept of how the system fits together as a whole, highlighting the relative connections of the individual levels.

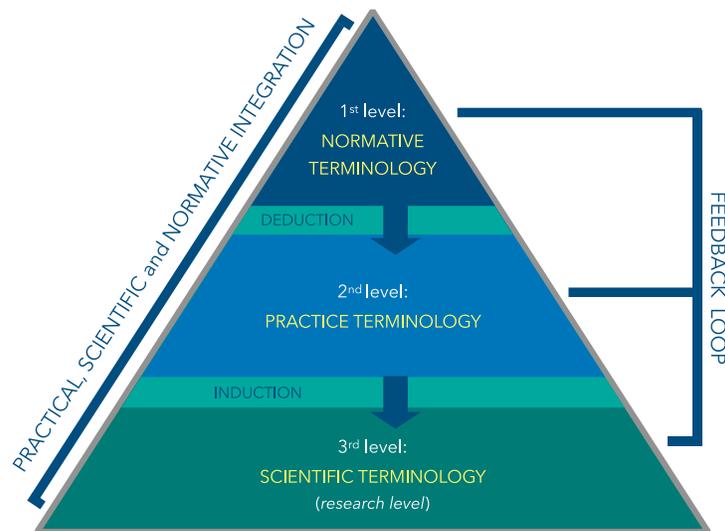


Figure 13. Representative diagram of levels and processes required to integrate normative, practice, and research in the field of physical and sport education.

Limits

The present review is only a preliminary study having limited raw data that must be integrated by a more articulated analysis (systematic review), including more scientific search engines. This should return complete, more precise, and consistent pictures of keywords used in scientific, normative, and practical fields related to physical and sports education.

Phase 7 – Future investigations

Using the vision of the DBR, the research design needs to be continuously implemented, modified, and integrated based on research and experiences previously conducted (Vaezi et al., 2019). Hence, based on the outcomes of the present research, further developments of a semantic framework of reference are based on a proposal of a specific

questionnaire to the community of practice to directly verify the interpretation of the different specific terms from the community of specialists and clarify the terminological ambiguities highlighted in the first step of our study.

The mentioned questionnaire (Appendix II) could be useful to test the semantic interpretation of the

terms that emerged in this study and are considered fundamental in teaching physical and sports education. It also will be implemented with further checks to compare populations with different sociocultural backgrounds and experiences.

Specifically, the comparisons will consider the following areas:

- I. Generalist vs. specialist teachers in elementary school.
- II. Teachers of PE and motor science (literal translation by the Italian term “Scienze Motorie”) vs. teachers of other subjects (Italian, maths, science...) in the middle and high school setting and different institutions.
- III. PE and motor science teachers vs. Federal sports technicians.
- IV. PE students vs. PE teachers.
- V. Middle and high school students vs. PE teacher’s teaching styles.
- VI. Practical community vs. academic community

Furthermore, future research should extend the physical education terms investigation and the proposed questionnaire to a large scale in the European community, not confined in the Italian reality.

In addition, further analysis based on group model building should involve trade associations, scientific societies, representatives of the scholastic and sports world, and political representatives. These stakeholders should be invited to select and define the common semantic general states of physical education starting from the results' analysis emerging from the questionnaire. In this way, a virtuous iterative process considering the previous arrival point as a starting point for the next proposal might be created (Easterday, Lewis, & Gerber, 2014).

Finally, a group of specialized researchers trained in DBR (Herrington, McKenney, Reeves, & Oliver, 2007) with practical competence in physical education should start further action research in different realities and fields (didactic/scholastic; sport/club; health/preventive) with the additional aim of sharing a common terminology.

Conclusion

Phase 8 – Summary: Final synthesis of preliminary concept description and subsequent intervention solutions

In this preliminary Design-Based Research utilizing a system-thinking approach, we identified the need for greater terminological consistency in the Italian physical education and sports context. In particular, in normative and academic field organizations, a lack of attention has been found to the terms that, in the operational motor field, are relevant for the community of practice. Starting from this

information obtained through a systemic approach, barriers, facilitators, and hypotheses of solutions were identified. Figure 14 evidences the sustainability of semantic ST methodology based on the sharing of knowledge, skills, procedure, and data interpretation, accomplished by dynamics actors (people, populations, and organizations) that interacting can really reduce the ambiguity of terminology and the semantic gaps in the theory and the practice of physical and sport education in the Italian context.

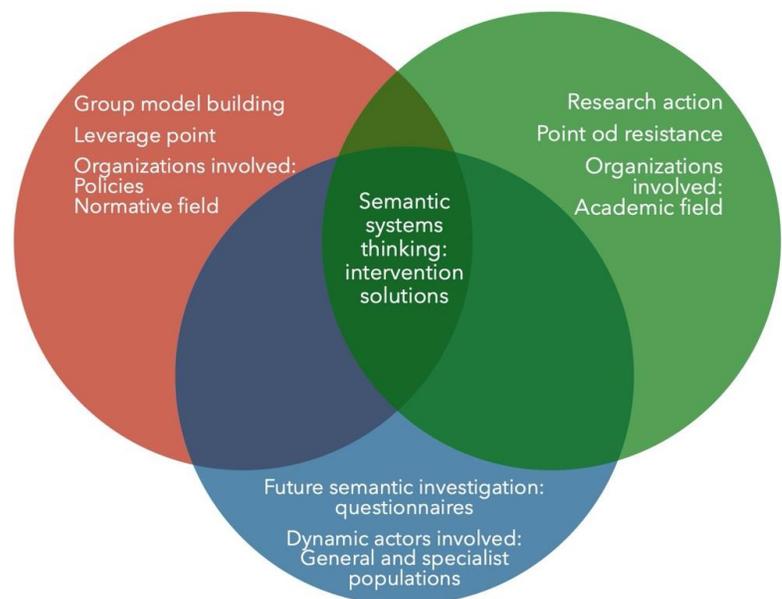


Figure 14. Semantic ST approach as a set of procedures involving different actors and multiple perspectives.

We think the semantic problems revealed by this preliminary study and the future development of group model buildings, research actions, and questionnaires could be used as a bridge between practice, normative, and scientific terminology. This necessary close communication based on the ST Approach and DBR principles could be generalizable to different realities and stakeholders involved in the field of sport (football club, artistic

gymnastics, combat sport, swimming, sports for the disabled, manager, etc.), physical activities for health (yoga, Pilates, rehabilitation gymnastics, gymnastics for the elderly, personal trainer, etc.), and physical education at school (school principals, support teachers, parents, municipal administrators, etc.).

The present conceptual framework, by approaches such as ST and reference principle as DBR, tried to enrich the horizon of physical education's semantic and modernizing forms of sharing.

References

- Baumann, E. (1907). *La ginnastica italiana: manuale per uso degli insegnanti elementari e di ginnastica, delle scuole normali maschili e femminili e dei corsi complementari* (Vol. 1). Roma: R. Scuola normale di ginnastica.
- Bérard, C. (2010). Group model building using system dynamics: An analysis of methodological frameworks. *Journal of Business Research*, 8, 13-24.
- Beyer, E. (Ed.) (1992). *Dictionary of sport science*. Schorndorf: Karl Hofmann.
- Boleda, G. (2020). Distributional Semantics and Linguistic Theory. *Annual Review of Linguistics*, 6(1), 213-234. doi:10.1146/annurev-linguistics-011619-030303
- Boni, O. (1962). *La motricità educativa* (Vol. 2). Bologna: CSEF.
- Bruner, J. S. (1996). *The Culture of Education*. Cambridge (MA): Harvard University Press.
- Buccino, G., Colagè, I., Gobbi, N., & Bonaccorso, G. (2016). Grounding meaning in experience: A broad perspective on embodied language. *Neuroscience and Biobehavioral Reviews*, 69, 69-78. doi:<https://doi.org/10.1016/j.neubiorev.2016.07.033>
- Cattaruzza, S. (2008). *L'indicazione della realtà: teoria dei segni e della conoscenza in Karl Bühler*. Milano: Mimesis.
- Cavana, R. Y., & Clifford, L. V. (2006). Demonstrating the utility of system dynamics for public policy analysis in New Zealand: the case of excise tax policy on tobacco. *System Dynamics Review*, 22(4), 321-348. doi:<https://doi.org/10.1002/sdr.347>
- Cohen, L., Manion, L., & Morrison, K. (2017). *Research Methods in Education*. London: Routledge.
- D.M. 30/10 n. 855. (2015). *Rideterminazione dei macrosettori e dei settori concorsuali*. (GU n.271). Retrieved from <http://attiministeriali.miur.it/anno-2015/ottobre/dm-30102015.aspx>
- D'Isanto, T. (2019). *Physical and sport education between Italian academic system and European Research Council structure panel*.

- Dede, C. (2005). Why Design-Based Research Is Both Important and Difficult. *Educational Technology*, 45(1), 5-8. Retrieved from <http://www.jstor.org/stable/44429182>
- Di Donato, M. (1984). *Storia dell'educazione fisica e sportiva*. Roma: Edizioni studium.
- Dolmans, D. H., & Tigelaar, D. (2012). Building bridges between theory and practice in medical education using a design-based research approach: AMEE Guide No. 60. *Medical Teacher*, 34(1), 1-10. doi:10.3109/0142159x.2011.595437
- Easterday, M. W., Lewis, D. R., & Gerber, E. M. (2014). *Design-based research process: Problems, phases, and applications*. Paper presented at the 11th International Conference of the Learning Sciences: Learning and Becoming in Practice, Boulder, USA.
- Ennis, C. D. (2011). Physical Education Curriculum Priorities: Evidence for Education and Skillfulness. *New Quest*, 63(1), 5-18. doi:10.1080/00336297.2011.10483659
- European Research Council. (2020). *New ERC panel structure in 2021 and 2022*. Retrieved from <https://erc.europa.eu/news/new-erc-panel-structure-2021-and-2022>
- Fedorenko, E., Blank, I. A., Siegelman, M., & Mineroff, Z. (2020). Lack of selectivity for syntax relative to word meanings throughout the language network. *Cognition*, 203, 104348. doi:10.1016/j.cognition.2020.104348
- Frasca, R. (1979). *L'educazione fisica e lo sport. Da Filangieri ai nostri giorni*. Chieti: Solfanelli.
- Galliani, L., Petrucco, C., & Dal Bon, C. (2004). *EduOnto: actors, processes, technologies: an ontology on educational acting*. Paper presented at the Open Learning and Distance Education, Lifelong learning in the networked world, Hong-Kong.
- Grifi, G. (1989). *Ginnastica - Storia dell'educazione fisica e dello sport*. Roma: Barain Edizioni.
- Grion, L., & Bernard, S. (2021). *Bernard suits. La filosofia del gioco*. Brescia: Scholé.
- Haag, H., Mess, F., Haag, G., & von Johannes Hanke, M. (2012). *Dictionary. Sport - Physical Education - Sport Science*. Berlin: Logos Verlag Berlin GmbH.
- Haff, G. G. (2010). Sport Science. *Strength and Conditioning Journal*, 31(2), 33-45.
- Harland, T., Kieser, J., & Meldrum, A. (2006). Cultural fragmentation of knowledge in clinical teaching. *Teaching in Higher Education*, 11(2), 149-160. doi:10.1080/13562510500527776
- Hastings, J., & Larsen, R. R. (2021). Integrative Paradigms for Knowledge Discovery in Mental Health: Overcoming the Fragmentation of Knowledge Inherent in Disparate Theoretical Paradigms. In J. D. Tenenbaum & P. A. Ranallo (Eds.),

- Mental Health Informatics: Enabling a Learning Mental Healthcare System* (pp. 295-316). Cham: Springer International Publishing.
- Herrington, J., McKenney, S., Reeves, T., & Oliver, R. (2007). *Design-based research and doctoral students: Guidelines for preparing a dissertation proposal*. Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications, Chesapeake, VA.
- Herrington, J., Reeves, T. C., & Oliver, R. (2014). Authentic Learning Environments. In J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 401-412). New York, NY: Springer New York.
- Kang, H., Nembhard, H. B., Ghahramani, N., & Curry, W. (2018). A system dynamics approach to planning and evaluating interventions for chronic disease management. *Journal of the Operational Research Society*, 69(7), 987-1005. doi:10.1057/s41274-017-0279-3
- LaBar, K. S., & Cabeza, R. (2006). Cognitive neuroscience of emotional memory. *Nature Reviews: Neuroscience*, 7(1), 54-64. doi:10.1038/nrn1825
- Lave, J. (1988). *Cognition in Practice: Mind, Mathematics and Culture in Everyday Life*. Cambridge: Cambridge University Press.
- Leontiev, D. A. (2013). Personal meaning: A challenge for psychology. *The Journal of Positive Psychology*, 8(6), 459-470. doi:10.1080/17439760.2013.830767
- Lier, L. V. (2010). The ecology of language learning: Practice to theory, theory to practice. *Procedia - Social and Behavioral Sciences*, 3, 2-6. doi:https://doi.org/10.1016/j.sbspro.2010.07.005
- Loprinzi, P. D., Frith, E., & Edwards, M. K. (2019). Exercise and Emotional Memory: a Systematic Review. *Journal of Cognitive Enhancement*, 3(1), 94-103. doi:10.1007/s41465-018-0086-z
- Marrone, G. (2001). *Corpi sociali : processi comunicativi e semiotica del testo*. Torino: Einaudi.
- McAteer, M. (2013). *Action Research in Education*. doi:10.4135/9781473913967
- Mumford, S. (2021). *A philosopher looks at sport*. Cambridge, UK: Cambridge University Press.
- Norton, B., & Toohey, K. (2011). Identity, language learning, and social change. *Language Teaching*, 44(4), 412-446. doi:10.1017/S0261444811000309
- Osberg, D. (2005). Redescribing "Education" in Complex Terms. *Complicity*, 2(1), 81-83. doi:10.29173/cmplct8731
- Pennebaker, J. W., Mehl, M. R., & Niederhoffer, K. G. (2003). Psychological Aspects of Natural Language Use: Our Words, Our Selves. *Annual Review of Psychology*,

- 54(1), 547-577.
doi:10.1146/annurev.psych.54.101601.145041
- Porretta, D. L., Nesbitt, J., & Labanowich, S. (1993). Terminology Usage: A Case for Clarity. *Adapted Physical Activity Quarterly*, 10(2), 87-96.
doi:10.1123/apaq.10.2.87
- Sanford, K. J., Hopper, T. F., & Starr, L. (2015). Transforming Teacher Education Thinking: Complexity and Relational Ways of Knowing. *Complicity*, 12(2), 26-48. doi:10.29173/cmplct23817
- Schölmerich, V. L., & Kawachi, I. (2016). Translating the Socio-Ecological Perspective Into Multilevel Interventions: Gaps Between Theory and Practice. *Health Education and Behavior*, 43(1), 17-20.
doi:10.1177/1090198115605309
- Seth, A. K. (2013). Interoceptive inference, emotion, and the embodied self. *Trends in Cognitive Sciences*, 17(11), 565-573.
doi:10.1016/j.tics.2013.09.007
- Seth, A. K., & Tsakiris, M. (2018). Being a Beast Machine: The Somatic Basis of Selfhood. *Trends in Cognitive Sciences*, 22(11), 969-981. doi:10.1016/j.tics.2018.08.008
- Siedentop, D., & Tannehill, D. (2000). *Developing teaching skills in physical education* (4th ed.). Mountain View, Calif.: Mayfield.
- Siokou, C., Morgan, R., & Shiell, A. (2014). Group model building: a participatory approach to understanding and acting on systems. *Public Health Res Pract*, 25(1). doi:10.17061/phrp2511404
- Snowden, J. S., Griffiths, H. L., & Neary, D. (1995). Autobiographical experience and word meaning. *Memory*, 3(3-4), 225-246. doi:10.1080/09658219508253152
- Standal, Ø. F., & Moe, V. F. (2013). Reflective practice in physical education and physical teacher education: A review of the Literature Since 1995. *New Quest*, 65, 220-240.
- Stenhouse, L. (1983). The relevance of practice to theory. *Theory Into Practice*, 22(3), 211-215.
doi:10.1080/00405848309543063
- Tulving, E., & Bower, G. H. (1974). The Logic of Memory Representations. In G. H. Bower (Ed.), *Psychology of Learning and Motivation* (Vol. 8, pp. 265-301): Academic Press.
- Ulmann, J. (1968). *Ginnastica, educazione fisica e sport. Dall'antichità ad oggi*. Roma: Armando Editore.
- Vaezi, H., Moonaghi, H. K., & Golbaf, R. (2019). Design-Based Research: Definition, Characteristics, Application and Challenges. *Journal of Education in Black Sea Region*, 5(1), 26-35.
doi:10.31578/jrebs.v5i1.185
- Valletti, F. (1893). *Storia della ginnastica*. Milano: Hoepli.
- Varzi, A. C. (2005). *Ontologia* (1. ed.). Roma: GLF Editori Laterza.

- Wandersman, A. (2003). Community science: bridging the gap between science and practice with community-centered models. *American Journal of Community Psychology*, 31(3-4), 227-242. doi:10.1023/a:1023954503247
- Wenger, E. (2006). *Apprendimento, significato e identità*. Milano: Raffaello Cortina Editore.
- Whitehead, M. (2010). *Physical Literacy: Throughout the Lifecourse*. Taylor & Francis.
- WHO Regional Office for Europe. (2022). *Systems thinking for noncommunicable disease prevention policy: guidance to bring systems approaches into practice*. Licence: CC BY-NC-SA 3.0 IGO.
- Willimczik, K. (1992). Interdisciplinary Sport Science: A Science in Search of its Identity. In H. Haag, O. Grupe, & A. Kirsch (Eds.), *Sport Science in Germany: An Interdisciplinary Anthology* (pp. 7-36). Berlin, Heidelberg: Springer Berlin Heidelberg.

Appendix I. The terminological analysis

Stage	Criterion	Term	Definition
Stage 1	Definition of the first principle (key concept, "umbrella" term)	Physical and Sports Education	Discipline that uses human motor skills and sports to stimulate and foster human's physical, motor, social, affective, intellectual, and moral growth throughout his life span (Brainstorming outcome).
Stage 2	S.2A - Definition of terms directly related to the first principle	Motor education	(Literal translation by the Italian) School discipline that uses human motor skills for formative purposes to foster in children a complete formation of personality (Enrile, 1968).
		Sports	Type of physical activity that involves structured competitive situations with established rules (Brainstorming outcome).
		Psychomotricity	Set of practices that concern the mutual integration of psychic functions with motor functions (Gori, 1982)
Stage 3	S.2B - Definition of the operational forms through which the first principle finds practical application "in the field" (Enrile, 1968)	Gymnastics	Organized activity through ordered series of physical and motor exercises with the aim of promoting the general health of the individual and optimal bodily mastery (Brainstorming outcome).
		Game/Play	Activity based on distensive, recreational forms of actions focused more on participation than on a result, allows for activity with low gradient of responsibility and constraint favoring a more relaxed and natural participation (Enrile, 1968).
		<i>Motor science</i>	<i>is not used in this choice why considered improper term used in ministerial school normative to define physical education (Brainstorming outcome).</i>
Stage 3	S.3A1 - Historical root of the terms (Boni, 1962; Di Donato, 1984; Frasca, 1979; Grifi, 1989; Ulmann, 1968)	Gymnastics	The science that studies physical exercise, its effects on the human organism, and ending in the attainment and maintenance of good health (Mercuriale, 1573). Linked to the term gymnastics is the term exercise, which Baumann interprets as <i>a deliberate and specified motor act</i> (Baumann, 1873, 1913).
		Giucoco (Game/Play)	Competition between two or more parties to the one who surpasses the other in a given quality, physical or intellectual or moral [...] all gymnastic exercises, none excluded, can be made the subject of a joust, and consequently, the essential thing is that one knows how to make the schoolchildren joust [...] the whole substance of the joust lies in the competition and nothing else but this (Baumann, 1922).
		Sports	Competition between athletes, carried out in the presence of interested spectators, aimed at the achievement of a prize by victory (Grion & Bernard, 2021).
		Physical education	The practical application of hygienic norms (Baumann, 1870). "Physical education is a philosophical goal which has as its effect the complete development of the personality through progressive and rational training in the meaning of life" (Tissié, 1919). Interestingly, Baumann, in 1873 and 1913, in two of his books, made use of the term psychokinesis, understanding it as the art of forming character and as education of the spirit by education of the body. This term can thus be considered the forerunner of the term psychomotricity and highlights the influence that gymnastics has on man's character and spirit (Baumann, 1873, 1913).
Stage 3	S.3A2 - Etymological root of the terms	Gymnastics	The word gymnastics has a peculiar etymology; on the one hand, it is properly understood as the art of exercising and training (<i>Gimnastiké. Techné</i> , art); on the other hand, the root of the word <i>Gimna</i> is <i>Gymnos</i> , which means "naked," as exercise among the Greeks was practiced naked (Treccani, 2023b).
		Giucoco (play)	The word comes from the Latin <i>iocus</i> , which means joke, mockery, or prank and from the Greek <i>paignion</i> , which has the same root as <i>pais</i> , meaning child and finds a connection with <i>paizen</i> , which refers to playing, dancing, playing, making love and with <i>paideia</i> which refers to education and culture (Treccani, 2023c).
		Sports	Sport is an English term abbreviation of <i>disport</i> , which means "fun." The English word <i>disport</i> is derived from the French word <i>desport</i> , meaning enjoyment. The French word <i>desport</i> is derived from the Latin word <i>deportare</i> , which means "to take away," in the sense of "to go outside one's city, one's walls, to engage in physical activities." In turn, the word amusement comes from the Latin verb <i>divertere</i> , which always means to get away. Paradoxically, the word athletics is derived from the Greek word <i>athlos</i> and recalls the concept of agon, of fighting, of winning the prize, usually attributable to sports (Treccani, 2023d).
Stage 3	S.3A2 - Etymological root of the terms	Didactic/scholastic	<i>Didactics of motor activities</i> : referring to the Greek etymology, this term is derived from <i>didaskalos</i> meaning teacher and the term <i>didaskalia</i> , meaning teaching; referring

<p>S.3B - Normative criterion. (2016 CUN – ERC linking keywords)</p>	<p>pillar</p>	<p>to Latin etymology, the derivation is from <i>didáctica</i> meaning the art of teaching (Treccani, 2023a). This term is related to pedagogical theory and, referring to the activities inherent in physical-motor education, relates to the ability to teach this discipline (Brainstorming outcome). <i>Didactics of sports activities</i>: it generally refers to the same general premises as didactics of motor activities. It is oriented more toward a specific domain of a given sports discipline that needs to be known to transmit it effectively and with educational values that consider the characteristics and age of the subjects it addresses (Brainstorming outcome). <i>Learning</i>: represents a change in behavior and performance that is relatively stable due to experience and has a direct relationship with the didactics and teaching styles used by the teacher (Brainstorming outcome).</p>
	<p>Sports pillar</p>	<p><i>Motor development</i>: constitutes a process of modification of physical and mental dispositions leading to an end state of formation, construction, and differentiation of physical abilities and motor skills (Brainstorming outcome). <i>Training</i>: complex process consisting of a set of programmed actions and interventions having the purpose of developing sports performance considering the different domains (physical, technical, psychological, mental, social) that condition it (Brainstorming outcome). <i>Performance</i>: represents the result of an action that, regarding the competitive sports sphere, is identified with how the activity is carried out in terms of performance in competitions (Brainstorming outcome). <i>Sports pedagogy</i>: generally, it represents the science that analyses the relationships between sports activities and the educational processes that sports can foster (Brainstorming outcome).</p>
	<p>Health-clinical-preventive pillar</p>	<p><i>Sports science</i>: represents the totality of scientific discoveries, knowledge, and methodologies related to sports and their characterizations (Brainstorming outcome). <i>Well-being</i>: is identified with the concept of quality of life and absence of discomfort. It considers all personal domains of the individual (physical, psychological, social, mental) and the types of environments (physical, social, cultural, economic, ...) in which the individual lives and relates (Brainstorming outcome). <i>Fitness</i>: this term is associated with health, quality of life, and physical efficiency (Brainstorming outcome). <i>Wellness medicine</i>: this term is associated with planned interventions aimed at disease prevention, the fight to delay aging processes, and interventions aimed at promoting or restoring bodily, social, and cognitive well-being (Brainstorming outcome). <i>Exercise science</i>: is based on the scientific evidence studying the effects of exercise and physical activity or lack thereof by making the results of studies known for prevention, therapy, and rehabilitation. (Brainstorming outcome).</p>
<p>S.3C - Criterion related to the most accessible information source by non-academic and non-specialized people (terms actually retrieved from Wikipedia: www.wikipedia.org)</p>	<p>Physical education</p>	<p>A branch of education concerned with improving through the motor and sporting activity the mental and physical development and health of the individual and the social [...]</p>
	<p>Game</p>	<p>[...] means a voluntary and intrinsically motivated activity carried out for recreational purposes. [...] The word "game" is also employed more specifically, referring to recreational activities that are competitive in nature and characterized by strictly defined goals and rules [...]</p>
	<p>Gymnastics</p>	<p>A term for various sports [...]</p>
	<p>Sport</p>	<p>Any form of competitive activity or game that aims to use, maintain, or improve psychophysical skills and abilities by providing enjoyment to participants and, in some cases, entertainment to spectators [...]</p>
	<p>Motor and sport Science</p>	<p>(literal translation by Italian) Set of disciplines that deal with physical activities and sport through the transversal study of medicine, psychology, physiology and sport education.</p>
	<p>Motor education / Sports education</p>	<p>(literal translation by Italian) Do not exist in Wikipedia; both relate to the term Physical Education.</p>
	<p>Psychomotricity</p>	<p>A discipline developed in France [...] The term "Psychomotricity" refers to a set of practices that use play and especially movement play, as their main tool to accompany and, if necessary, help the evolution and development of the personality, understood as a unity of body, mind and emotion, in the different stages of growth and life [...].</p>
<p>S.3D - Criterion related to terminological internationality (the key concepts related to the need</p>	<p>Physical Literacy</p>	<p>The concept of Physical Literacy has stimulated increasing attention in scientific pedagogical research in recent years (29 studies in 2014). It is referable, in a metaphorical sense, to the "motor literacy development" inherent in a cultural process of growth, synonymous not only with motor literacy but, above all, with a broader formative process that, if used consciously, makes it possible to transform simple, aseptic and abstract grammatical-motor notions into a process that allows the acquired</p>

for semantic analysis that emerge from this classification are related to scientifically oriented terminology that frequently emerges in scientific publications that are oriented toward issues with a specific educational-methodological character)	Executive functions	knowledge and skills to be used for its own social utility in real contexts of relational or professional life (Harwood, Keegan, Smith, & Raine, 2015). In essence, the analogy in the literary field with writing and reading (the term, in fact, means "physical literature") should not be reduced to a concept of pure logical or grammatical analysis but integrated into an enriching cultural process that allows one to use knowledge and skills to solve real-life problems (Corbin, 2016; Whitehead, 2010).
	Actual motor competence	Functions involved in the regulation/management of behaviour and pertain to self-control/inhibition, working memory, and flexibility of response by allowing one to exercise optimal planning and control and management of one's psycho-motor behaviours (Ball et al., 2011).
	Perceived motor competence	A person's ability to perform a wide range of motor actions that are useful for social life, sports practice, and fitness (Robinson et al., 2015).
	Self-efficacy	It relates to an individual's perception of his or her motor skills and is considered a primary motivational factor related to the practice of physical activity and sports (Estevan & Barnett, 2018).
	Enjoyment	Self-efficacy represents self-perception, self-awareness, self-mastery, and confidence in the ability to successfully master a situation in various everyday contexts and activities (Bandura, 1995).
		In the motor-sport domain, it is defined as "a positive affective response toward motor-sport experience that reflects generalized feelings such as pleasure, liking, and enjoyment" (McCarthy, Jones, & Clark-Carter, 2008).

REFERENCES

- Ball, G., Stokes, P. R., Rhodes, R. A., Bose, S. K., Rezek, I., Wink, A. M., . . . Turkheimer, F. E. (2011). Executive functions and prefrontal cortex: a matter of persistence? *Frontiers in Systems Neuroscience*, 5, 3. doi:10.3389/fnsys.2011.00003
- Bandura, A. (1995). *Self-efficacy in changing societies*. New York, NY, US: Cambridge University Press.
- Baumann, E. (1870). *La ginnastica ne' suoi rapporti con la medicina e la igiene : tesi per l'esame di laurea del candidato Emilio Baumann*.
- Baumann, E. (1873). *Psico-cinesia ovvero l'arte di formare il carattere*. Roma: presso l'autore.
- Baumann, E. (1913). *Psicocinesia, ovvero, L'educazione dello spirito mediante quella del corpo*. Roma: presso l'autore.
- Baumann, E. (1922). *Manuale di ginnastica italiana : ad uso degli insegnanti elementari e delle scuole normali*. Roma.
- Boni, O. (1962). *La motricità educativa* (Vol. 2). Bologna: CSEF.
- Corbin, J. (2016). Taking an analytic journey. In *Developing grounded theory* (pp. 35-54): Routledge.
- Di Donato, M. (1984). *Storia dell'educazione fisica e sportiva*. Roma: Edizioni studium
- Enrile, E. (1968). *I principi fondamentali dell'educazione fisica* (Vol. I - della teoria delle attività motorie educative). Roma: Società Stampa Sportiva.
- Estevan, I., & Barnett, L. M. (2018). Considerations Related to the Definition, Measurement and Analysis of Perceived Motor Competence. *Sports Medicine*, 48(12), 2685-2694. doi:10.1007/s40279-018-0940-2
- Frasca, R. (1979). *L'educazione fisica e lo sport. Da Filangieri ai nostri giorni*. Chieti: Solfanelli.
- Gori, M. (1982). *L'educazione fisica contemporanea*. Roma: Società Stampa Sportiva.
- Grifi, G. (1989). *Ginnastica - Storia dell'educazione fisica e dello sport*. Roma: Barain Edizioni.
- Grion, L., & Bernard, S. (2021). *Bernard suits. La filosofia del gioco*. Brescia: Scholé.
- Harwood, C. G., Keegan, R. J., Smith, J. M. J., & Raine, A. S. (2015). A systematic review of the intrapersonal correlates of motivational climate perceptions in sport and physical activity. *Psychology of Sport and Exercise*, 18, 9-25. doi:https://doi.org/10.1016/j.psychsport.2014.11.005
- McCarthy, P. J., Jones, M. V., & Clark-Carter, D. (2008). Understanding enjoyment in youth sport: A developmental perspective. *Psychology of Sport and Exercise*, 9(2), 142-156. doi:https://doi.org/10.1016/j.psychsport.2007.01.005
- Mercuriale, G. (1573). *De arte gymnastica*. Venetiis: Apud Iuntas.
- Robinson, L. E., Stodden, D. F., Barnett, L. M., Lopes, V. P., Logan, S. W., Rodrigues, L. P., & D'Hondt, E. (2015). Motor Competence and its Effect on Positive Developmental Trajectories of Health. *Sports Medicine (Auckland, N.Z.)*, 45(9), 1273-1284. doi:10.1007/s40279-015-0351-6

- Tissié, P. (1919). *L'éducation physique et la race : santé, travail, longévité / Dr Philippe Tissié*. Paris: Ernest Flammarion, éditeur.
- Treccani. (2023a). Didattico - Enciclopedia online. Retrieved from <https://www.treccani.it/vocabolario/didattico/>
- Treccani. (2023b). Ginnastica - vocabolario online. Retrieved from <https://www.treccani.it/vocabolario/ginnastica/>
- Treccani. (2023c). Giuoco - Enciclopedia online. Retrieved from <https://www.treccani.it/vocabolario/ricerca/GIUOCO/>
- Treccani. (2023d). Sport - Enciclopedia online. Retrieved from <https://www.treccani.it/vocabolario/sport/>
- Ulmann, J. (1968). *Ginnastica, educazione fisica e sport. Dall'antichità ad oggi*. Roma: Armando Editore.
- Whitehead, M. (2010). *Physical Literacy: Throughout the Lifecourse*: Taylor & Francis.

Appendix II. Transdisciplinary convergence of the theory of practice into the practice of theory. The original Italian questionnaire for Teachers' interpretation of terms used in motor sciences, physical education, and sport.

Research on the interpretation of terminology in the fields of Motor Sciences, Physical Education, and Sport

PERSONAL DATA

1. Sex M F Other 2. Age _____

3. Degree

- Primary school diploma
- Middle School diploma
- High school graduation
- Degree
- Postgraduate

4. Length of service

- 0-5 years
- 10-15 years
- 15 - 25 years
- 25 - 30 years
- > 30 years

5. Type of school or institution where you work

- Classical High School
- Scientific high school
- Linguistic high school
- Technical or vocational school
- Psycho-pedagogical institute
- Primary School
- Lower secondary school

6. Role within the school complex

- Principal
- Role teacher
- Support teacher
- Substitute
- Other _____

7. Role in sports fields

- Instructor
- Youth coach
- High-level coach
- Trainer
- No role
- Other _____

6. Discipline taught _____

The terms that we will consider in this questionnaire as an object of semantic interpretation will be the following:

- Sport
- Physical education
- Gymnastics
- Game
- Motor Sciences
- Physical education
- Psychomotricity
- Sports Education

For each meaning proposed, in relation to each term, put a cross on the box relating to the numbers that best reflect your opinion, using the following scale of values. In the free boxes, you can enter further meanings which, in your opinion, better characterize the term in question.

1 I do not at all agree	2 Disagree	3 Neutral	4 Agree	5 Very much agree
----------------------------	---------------	--------------	------------	----------------------

1. SPORT IS:

1.	competition	1	2	3	4	5
2.	fun	1	2	3	4	5
3.	game	1	2	3	4	5
4.	socialization	1	2	3	4	5
5.	excessive selection	1	2	3	4	5
6.	reduction of other social activities and willingness to study	1	2	3	4	5
7.	training	1	2	3	4	5
8.	means of education	1	2	3	4	5
9.	positive influence on the psyche	1	2	3	4	5
10.	physical-motor development	1	2	3	4	5
11.	OTHER:	1	2	3	4	5
12.	OTHER:	1	2	3	4	5

2. PHYSICAL EDUCATION IS:

1.	motor development	1	2	3	4	5
2.	means of education	1	2	3	4	5
3.	discipline that can promote the learning of other school subjects	1	2	3	4	5
4.	practical school subject	1	2	3	4	5
5.	free play and recreation	1	2	3	4	5
6.	health education	1	2	3	4	5
7.	sport	1	2	3	4	5

8.	not very useful in school	1	2	3	4	5
9.	gymnastics	1	2	3	4	5
10.	training	1	2	3	4	5
11.	OTHER:	1	2	3	4	5
12.	OTHER:	1	2	3	4	5

3. GYMNASTICS IS:

1.	form of school physical education	1	2	3	4	5
2.	health education	1	2	3	4	5
3.	discipline no longer current	1	2	3	4	5
4.	fun	1	2	3	4	5
5.	discipline that promotes bodily mastery	1	2	3	4	5
6.	activity organized through an ordered series of physical and motor exercises	1	2	3	4	5
7.	sport	1	2	3	4	5
8.	exclusively scholastic discipline	1	2	3	4	5
9.	discipline that promotes self-control	1	2	3	4	5
10.	boring discipline	1	2	3	4	5
11.	OTHER:	1	2	3	4	5
12.	OTHER:	1	2	3	4	5

4. THE GAME IS:

1.	fantasy	1	2	3	4	5
2.	fun	1	2	3	4	5
3.	emotional involvement	1	2	3	4	5
4.	waste of time	1	2	3	4	5
5.	activity that favors the acquisition of rules and roles	1	2	3	4	5
6.	form of physical education	1	2	3	4	5
7.	form of sport	1	2	3	4	5
8.	activity that promotes psychological and cognitive development	1	2	3	4	5
9.	activities with a low degree of responsibility	1	2	3	4	5
10.	activity that may lead to exclusion	1	2	3	4	5
11.	OTHER:	1	2	3	4	5
12.	OTHER:	1	2	3	4	5

5. MOTOR SCIENCES ARE:

1.	physical education	1	2	3	4	5
2.	game	1	2	3	4	5
3.	scientific discipline	1	2	3	4	5
4.	practical school discipline	1	2	3	4	5
5.	with a predominantly theoretical approach	1	2	3	4	5
6.	sport	1	2	3	4	5

7.	discipline unsuitable for a school setting	1	2	3	4	5
8.	university study course	1	2	3	4	5
9.	healthcare discipline	1	2	3	4	5
10.	pedagogical discipline	1	2	3	4	5
11.	OTHER:	1	2	3	4	5
12.	OTHER:	1	2	3	4	5

6. MOTOR EDUCATION IS:

1.	Physical education	1	2	3	4	5
2.	exclusively scholastic subject	1	2	3	4	5
3.	free play and recreation	1	2	3	4	5
4.	discipline that promotes health	1	2	3	4	5
5.	secondary school discipline	1	2	3	4	5
6.	discipline that can promote the learning of other school subjects	1	2	3	4	5
7.	play education	1	2	3	4	5
8.	sports education	1	2	3	4	5
9.	psychomotricity	1	2	3	4	5
10.	physical development	1	2	3	4	5
11.	OTHER:	1	2	3	4	5
12.	OTHER:	1	2	3	4	5

7. PSYCHOMOTRICITY IS:

1.	physical education	1	2	3	4	5
2.	motor education	1	2	3	4	5
3.	game	1	2	3	4	5
4.	practical discipline that favors the development of the mind	1	2	3	4	5
5.	discipline that promotes motor control	1	2	3	4	5
6.	motor sciences	1	2	3	4	5
7.	psycho-pedagogical discipline	1	2	3	4	5
8.	discipline that can be placed in child neuropsychiatry and learning disorders	1	2	3	4	5
9.	boring	1	2	3	4	5
10.	discipline that is not physically demanding	1	2	3	4	5
11.	OTHER:	1	2	3	4	5
12.	OTHER:	1	2	3	4	5

8. SPORTS EDUCATION IS:

1.	sport	1	2	3	4	5
2.	school discipline	1	2	3	4	5
3.	introduction to competitive sport	1	2	3	4	5
4.	training	1	2	3	4	5

5.	positive for all areas of the personality (cognitive, social, affective)	1	2	3	4	5
6.	educational and social tool	1	2	3	4	5
7.	form of physical education	1	2	3	4	5
8.	game	1	2	3	4	5
9.	selective	1	2	3	4	5
10.	excessively focused on competition	1	2	3	4	5
11.	OTHER:	1	2	3	4	5
12.	OTHER:	1	2	3	4	5