



ARTIGOS

# SYSTEMIC THINKING: A NEW CURRICULAR APPROACH IN PHYSICAL EDUCATION TEACHER FORMATION

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**ABSTRACT:** The world is changing and education needs to change. The best example of this is the current coronavirus pandemic. We not only have to live with these changes, but also have to be able to influence them together. In modern science, such influences are based on interdisciplinary thinking. In science, this interdisciplinary thinking is also known as systemic thinking. The article is an call for systemic thinking in sports sciences and Physical Education teachers' formation. In the first part of the article, the theory of systemic thinking is presented with reference to Fritjof Capra. In the second part, the approach of systemic thinking is transferred to the sports sciences and illustrated in detail using the example of an international curriculum development project between the Federal University of Santa Maria and the Technical University of Braunschweig (Germany). The so called "modularized curriculum" is presented and its systemic approach is explained using an intra and intermodular example.

**KEYWORDS:** Systemic thinking. Curriculum. Self-education. Movement.

## PENSAMENTO SISTÊMICO: UMA NOVA ABORDAGEM CURRICULAR NA FORMAÇÃO DE PROFESSORES DA EDUCAÇÃO FÍSICA

**RESUMO:** O mundo está mudando e a educação precisa mudar. O melhor exemplo disso é a atual pandemia do coronavírus. Não temos apenas que conviver com essas mudanças, mas também que ser capazes de influenciá-las juntos. Na ciência moderna, tais influências são baseadas no pensamento interdisciplinar. Na ciência, esse pensamento interdisciplinar também é conhecido como pensamento sistêmico. O artigo é um apelo ao pensamento sistêmico nas ciências do esporte e na formação de professores de Educação Física. Na primeira parte do artigo, é apresentada a teoria do pensamento sistêmico com a referência a Fritjof Capra. Na segunda parte, a abordagem do pensamento sistêmico é transferida para as ciências do esporte e ilustrada em detalhes usando o exemplo de um projeto de desenvolvimento curricular internacional entre a UFSM e a universidade Técnica de Braunschweig (Alemanha). O chamado “currículo modularizado” é apresentado e sua abordagem sistêmica é explicada usando um exemplo intra e intermodular.

**PALAVRAS-CHAVES:** Pensamento sistêmico. Currículo. Autoeducação. Movimento.

## PENSAMIENTO SISTÉMICO: UN NUEVO ENFOQUE CURRICULAR EN LA FORMACIÓN DE PROFESORES DE EDUCACIÓN FÍSICA

**RESUMEN:** El mundo está cambiando y la educación debe cambiar. El mejor ejemplo de esto es la actual pandemia del coronavirus. No solo tenemos que vivir con estos cambios, sino que también tenemos que poder influir juntos en ellos. En la ciencia moderna, estas influencias se basan en el pensamiento interdisciplinario. En ciencia, este pensamiento interdisciplinario también se conoce como pensamiento sistémico. El artículo es una llamada al pensamiento sistémico en las ciencias del deporte y en la formación de profesores de Educación Física. En la primera parte del artículo se presenta la teoría del pensamiento sistémico con referencia a Fritjof Capra. En la segunda parte, el enfoque del pensamiento sistémico se traslada a las ciencias del deporte y se ilustra en detalle utilizando el ejemplo de un proyecto de desarrollo curricular internacional entre la Universidad Federal de Santa María y la Universidad Técnica de Braunschweig (Alemania). Se presenta el llamado “currículo modularizado” y se explica su enfoque sistémico utilizando un ejemplo intra e intermodular.

**PALABRAS CLAVE:** Pensamiento sistémico. Currículo. Autoeducación. Movimiento.

## Introduction

For months, a virus has been showing us how vulnerable our coexistence can be and how disturbed we are by the threats of this pandemic. Virologists gain prominence with their explanations. Politicians and the general public expect them to provide quick but well-founded advice on what to do.

So far, however, there has been no systemic consideration of how the pandemic has affect social development. Showing possible solutions, however, requires much more than knowledge of individual disciplines. Scientists have to open the door to other kinds of knowledge, to the results of other subjects, and to discoveries and knowledge from other sectors of society.

How can this be done? Researchers/scientists have to know how to dialogue, they have to strive for transparency, but above all they have to think and act in complex scientific scenarios. They must be ready to consider the social consequences of their own actions. This requires a high degree of humility to keep an eye on the limits of their own methods and possibilities for judgment – especially when politics and the public demand clear statements that can save the arduous struggle for the right solution.

Today, more than ever, science needs what philosopher Elijah Millgram calls “interface management” (2009, p. 158): the ability to combine different forms of knowledge and stocks of knowledge. Science has to ask itself what the other person has to absolutely understand about the claims made in order to be able to classify them correctly. How can one clarify the revisibility of claims without giving the impression of complete relativism? This is especially true if we want to include civil society in science, that is, if we want to do not only fundamental research (axiomatic research), but also and above all applied research. An example of this is school and teaching research, in which, as we know, sports science, which forms future Physical Education teachers, is involved. A future Physical Education teacher needs knowledge about a wide variety of sports science disciplines, such as pedagogy, training, movement theory, sports sociology etc.

A systemic vision means leading the Physical Education teacher to know:

- how he approaches the problem and seeks solutions;
- how he motivates the students to a conscious life movement, that is, a reflective and active life;
- what he can do in cooperation with teachers of other school subjects, with the school principal, with the bodies responsible for school administration to improve the precarious situation in schools, whether municipal, state, private etc.

The “interface management” here means that the Physical Education teacher must bring together knowledge from various sciences and from civil authorities to find solutions. This requires learning processes in university education that conveys the necessary skills for systemic thinking and action. For this, a fundamental renewal of curricula is needed. In the current curricula of most Brazilian institutions that form Physical Education teachers, there is no room for systemic thinking and, therefore, for the development of judgment skills and the inclusion of interdisciplinary and intersectoral projects. If these projects are strengthened, then there will also be the chance to think and shape new approaches, supported by the advantage to experiment. For sports science to make its contribution to the “interface management” of different types of knowledge, it must give up its thinking where sports science disciplines are studied in an isolation way, as well as the

separation between theory and practice, and replace it with a curriculum that calls for systemic thinking and interdisciplinary projects.

Next, we present a curriculum project within the Physical Education teacher formation program at the Federal University of Santa Maria - UFSM, which aims to introduce students to systemic and acting thinking. We refer to systemic thinking mainly as the connection between movement, education, teaching, school, and areas of life outside of school. First, however, it will be explained what is meant by "systemic thinking"

### **Systemic thinking – a context thinking**

The example of the pandemic mentioned at the beginning of the article is representative of a number of global, alarming, problems. Capra already stated in his 1996 book "The web of life. A new scientific understanding of living systems" that the damage to the biosphere and human life is so severe that it may soon become irreversible (1996, p. 14). This means that no field of science can escape ecological issues, so, the sports sciences can also be called upon to confront these issues intensely and, then, review their self-image and scientific paradigm. Since today's problems are not individual problems, but problems in systemic networks (health, environmental, pandemic problems etc.), it will be necessary to approach the issues in an interdisciplinary way in the systems science method. The systemic thinking draws conclusions from systemic characteristics such as the properties of a whole to the properties of the parts. Systems are holistic, their properties cannot be reduced to the properties of smaller parts. Systems cannot be understood as the sum of the characteristics of the parts.

The systemic thinking does not use an analytical procedure, that is, decomposition into individual components, but rather context-related thinking and explains phenomena in terms of their connection. System thinking is therefore relational thinking, community thinking, ecological (network) thinking, holistic (global) thinking (CAPRA, 1996, p. 36-41; 43-45). Based on the characteristic properties of systemic thinking, it can be stated that the scientific way of thinking of systems thinking can be attributed to a holistic scientific paradigm. Thus, it differs from a mechanistic scientific paradigm.

Sports science is understood as a systemic science. If sports science sees itself as a systemic science, then, it must organize its understanding of science in the sense of a holistic scientific paradigm. With this, however, traditional sports science finds itself caught between the natural science paradigm and the paradigm of the human sciences, which can be interpreted as a clear sign of an outdated body-mind dualism in the understanding of sports. This traditional epistemological problem will be briefly explained using the example of sports science.

### **From linear thinking to systemic thinking through a paradigm shift in sports science**

By paradigm we mean a certain understanding of science, that is, a certain generally recognized doctrine. Sports science is not based on a generally accepted doctrine. Instead, it lies between two paradigms: the paradigm of natural science and that of the human science. The goal of natural world science research is to develop theories and predictions that are as accurate as possible about the various processes in the universe. In addition, technical devices, especially with the help of electronic data processing, can be used to reproduce models of the future, rescue and improvement of the world that allow us to look forward to the future with hope, despite the uncertain world situation. However, scientific ways of thinking are determined by rational-analytical thinking. The thinking is based on linear, one-dimensional cause-and-effect thinking.

The belief in the viability of the natural sciences is unshakable, although recently doubts have arisen about the safety and credibility of technology. The picture that the natural sciences have constructed of nature and the world is unilateral and incomplete. It is limited to the part that can be recognized by us, and the knowledge of the supposed reality with technical means represents only a slice of the world around us. One can definitely come to the conclusion that the scientific worldview that exists today is an expression of human overestimation, even arrogance. This worldview is referred to in the paradigm discourse as a mechanistic worldview. This mechanistic worldview still determines the researches on the human body and human movement today. It is characterized by viability thinking and a subject-object dualism, which, to this day, also determine the content of Physical Education teacher formation curricula (HILDEBRANDT-STRAMANN; TAFFAREL, 2017, p. 20). An expression of this subject-object dualism is also the separation of the human being into body and mind with its fatal consequences in medicine, sports and education (see the following considerations). Just as the separation between matter and energy became obsolete in Einstein's theory of relativity, the separation between body and mind is also being increasingly re-evaluated. The discussion about the paradigm shift that began in the sciences in the 1960s is about replacing the "mechanistic world view" or the "Cartesian paradigm" with a holistic view that overcomes the subject-object dualism and is reflected in a systemic paradigm.

In contrast to natural-scientific thinking, human science thinking cannot be attributed to the systemic paradigm per se. Thinking in the humanities must then be attributed to a systemic worldview (synonymous with systemic paradigm) if it is a matter of multidimensional networked process thinking. Such thinking is connected with the abolition of a causal and analytical approach to human phenomena and the abolition of subject-object dualism in favor of a relational and holistic view of the relationship between individuals and object/world. A curriculum that claims not to convey eclectic knowledge to students, but a modern, holistic worldview, must reflect this systemic paradigm in its structure and content. Next, we will present a curriculum for Physical Education teacher education as a proposal. In the first part, the systemic structure will be discussed, and, in the second part, the systemic way of thinking using the example of a subject to be studied.

### **A new curriculum proposal for Physical Education teacher formation at the Federal University of Santa Maria**

The new curriculum proposal for Physical Education teacher education at Federal University of Santa Maria is the result of an international curricular project for Physical Education teacher formation between the Federal University of Santa Maria and the Institute of Sports Sciences and Movement Education of the Technical University of Braunschweig/ Germany (HILDEBRANDT-STRAMANN; HATJE; PALMA; OLIVEIRA, 2020). As already mentioned, the new proposal presupposes, among other things, to overcome thinking in individual scientific disciplines and the separation between theory and practice and, instead to promote systemic thinking, that is, thinking in contexts. To meet these requirements, the project team designed a so-called "modularized curriculum". As shown in figures 1 and 2 below, the modularized curriculum consists of two sections. In the first section, students of the Bachelor's degree and Bachelor's degree in Education study together. This study section lasts four semesters and contains 10 modules. The second section of the course is specially tailored for the Bachelor's degree in Education. This study section also lasts four semesters, but contains only seven modules. The module structure alone does not contribute to the need to develop a systemic basis. The claim can only be met if:

(a) the individual modules are based on a common movement paradigm and education paradigm, that is, if an intermodular theoretical homogeneity is established;

b) the seminar contents in the individual modules relate to each other, that is, if an intramodular structure has been established across the contents; and

c) the theoretical and practical seminars are related.

Next, the example of module 1L will be used to explain these three requirements and clarify the systemic approach.

**Fig. 1: Modules of the initial four semesters: common (C) for Bachelor's degree (B) and Bachelor's degree in Education (BED).**

Source: Hildebrandt-Stramann; Hatje; Palma; Oliveira (2020, p. 23).

**Fig. 2: Modules from fifth to eighth semester, specific to the Bachelor's degree in Education (BED).**

Source: Hildebrandt-Stramann; Hatje; Palma; Oliveira (2020, p. 25).

## **The systemic structure of the curriculum – intermodular homogeneity through a dialogical understanding of movement**

Intermodular homogeneity is established through a common movement paradigm. As we can see in figures 1 and 2, all modules contain the aspect of movement. Human movement is the central subject of this study. In this respect, human movement is the central starting point for all other module-specific topics. At this point, the question arises about the understanding of human movement. To meet the demands of systemic thinking, it can only be a relational understanding of movement that explains how people relate to the social and material world through movement. We find this understanding of movement in anthropological phenomenology as understood by Merleau Ponty (1966) and applied to movement by Gordijn.

Gordijn, a Dutch pedagogue, understands movement as a metaphor. The movement paradigm is considered as the dialogical theory of movement. Gordijn says: "Human movement is a dialogue between man and the world" (quoted by TAMBOER, 1979, p. 14). By this, Gordijn means: each man talks to his world and, in this case, his language is movement. Man asks, as he moves, movement questions to his world and receives movement answers. The world is not only the environment (in the physical sense), but also other men. Man comes into contact with things or men through movement. Movement, therefore, is understood as neither man's nor the world's, but only in their relationship. With this, Gordijn wants to express, entirely in the sense of systemic thinking, that he does not accept a separation of the different instances within the event; for example, a separation of the body and the spirit, the driving system and the intention. The intention, the meaning, that we preconfigure in relation to the evaluation of the final result, cannot and should not be separated by the movement from what happens in the modifications of the body's position. Movement is always full of intention, it is always a man who moves. This movement has an individual and special product. Within the dialog, within this game of question and answer, man identifies movement meanings of things and of other men. He projects the meanings into the question: "What could this be?" And receives the meaning in the answer and in the overall process of the dialogue.

Moving is just one form of man's dispute with his world, from which he receives the meanings. Gordijn adds two more forms: thinking and speaking. For example, it is possible to observe water in a swimming pool and think about it. It is also possible to say something about the water in the pool. And it is also possible to throw yourself into the water. Therefore, man lives in different worlds of meanings that are increasingly determined by the way of access he can choose. Thus, the environment has different meanings for men. For example, the meaning of movement.

We should return to the example of the swimming pool. Only when we cross the boundary between the edge of the pool and the water, and we enter into the water, we can discover and test the meanings of movement that the water holds. These are, for example, the meanings that water carries when we move to pull and/or push the water to cause propulsion (HILDEBRANDT-STRAMANN; HATJE; PALMA; OLIVEIRA, 2020, p. 195-207). The example shows that the world can not only be identified by thinking, but also by moving. Movement is a means of knowledge and we identify its meaning of movement with this.

The intermodular approach of systemic thinking, or thinking in contexts, consists in the fact that all other topic-specific considerations in the individual modules are based on this relational and dialogical understanding of movement. This means, for example, in the module "Movement and Health" (module 3 C), that students carry out a survey to find an understanding of health that is compatible with a relational understanding of movement. We find such an understanding in the salutogenic approach of health, which we contrast with a

pathogenetic understanding (cf. HILDEBRANDT-STRAMANN; HATJE; PALMA; OLIVEIRA, 2020, p. 82-98). Regarding the module “Movement and Training” (HILDEBRANDT-STRAMANN; TAFFAREL, 2017, p. 217-238), this means developing an understanding of training compatible with the relational understanding of movement. We find such an understanding of training in a concept of subjective training, according to which students learn to train themselves, that is, they learn to build a balance (a balancing relationship) between objective and subjective loads.

### **The systemic way of thinking – the intramodular homogeneity through seminar contents in the modules**

To clarify the principle of intramodular homogeneity through the contents of the module seminars, we choose module 1BED: “Movement, education, teaching, and a campus of experience and learning” (see fig. 2). This module includes at least four seminars: a seminar on movement theories, a seminar on educational theories, a seminar on teaching theories, and a practical seminar, which is imported from module 3BED (HILDEBRANDT-STRAMANN; HATJE; PALMA; OLIVEIRA, 2020, p. 39). In terms of the three requirements for systemic thinking mentioned, students should learn that:

1. the understanding of movement and education follow a basic relational understanding;
2. because of this relational character, the selection of the understanding of education and movement to start movement classes in school is not arbitrary, both understandings are compatible with each other;
3. the selection of a relational understanding of movement and education determines the type of teaching, that is, the didactics planning and movement practice in schools and universities.

In the first seminar of this module, students learn about the various movement theoretical models. According to Buytendijk (1956), two different paradigms can be identified in movement theory:

1. the natural science paradigm;
2. the phenomenological paradigm of movement (TREBELS, 1992, p. 338 to 344).

Students should know these two paradigms and then reflect on the justification of why we define the phenomenological movement paradigm and, with that, the human movement as the object of study in a university course of Physical Education (HILDEBRANDT-STRAMANN, 2013, p. 105-117).

As we have already described the phenomenological paradigm of movement in the form of a relational (dialogical) theory of movement, we will now present a relational understanding of education. This understanding of education is found in the theorem of education for self-education.

### **The education paradigm of the modularized curriculum – education for self-education**

We are looking for a relational understanding of education that is compatible with the relational understanding of movement presented above. We found such an understanding of education in the theory of education for self-education.

Education is a part of general socialization, that is, that sector of conscious and socially regulated interactions in which the young person, in his process of development, is qualified to learn cultural manners of a

society and to pursue his development, and, in this process of qualification, becomes an independent and responsible person.

This introduction was described from two related dimensions:

(a) as a process of socialization, by which children and young people develop themselves as social beings;

b) as a process of individuation, whereby children and young people develop themselves as unique and unmistakable individuals.

In the context of this general socialization, education represents an organized, planned, systematized, and intentional field, whereby, in our society, specific social institutions, such as the family or the school, are responsible for the daily construction.

As an elementary goal for the formation of Physical Education students, we have the development of the ability to act, since education always aims at the individual, the learner. Its interest, however, cannot be reduced to an individualistic conception, but rather its social historical meaning must remain clear, without, however, renouncing its individual aspect. Education must be placed within the normative range that goes from individual self-realization to the emancipation of society. These aspects base the pedagogical ideal of an individual who is able to become active through education; an individual who can operate in the various existing sectors of society but, at the same time, is interested in the development of a democratic society and is able to participate rationally in this change. Participation in society as it is and the problematization of its hardened structures and its new perspectives constitute the two dialectically bounded dimensions of a pedagogical concept of capacity for action.

Education that is interested in an individual capable of acting, takes place as a communicative action (HILDEBRANDT-STRAMANN, 2020). Thus, it is understood as an action that does not aim to convey meaning, but rather aims much more at understanding the guidelines and goals of action. Through acting in practice and reflection, the learners should be enabled to understand "their world" and social reality to become aware of the conditions, possibilities, and consequences of their actions: their own explanation and reflection rather than manipulation. For this, it is necessary as well to take children and young people seriously as university individuals. In their academic life, students need a certain freedom to organize and carry out their studies. But the difference in regard to school is that the student must learn and adopt attitudes toward self-education. To develop the capacity for self-education, in addition to attitude, a corresponding educational "environment" is needed. By "environment" (milieu) we understand the personal relations between student and teacher, based on understanding and on the teaching method that is determined through the intermediation between the student and the school discipline.

### **The didactics paradigm – a didactics conception of lessons open to experiences**

In terms of the didactics context of an understanding of movement, an education and teaching (HILDEBRANDT-STRAMANN, 2016, p. 49-52), this third module seminar called teaching didactic concepts is about analyzing the current didactics concepts of Physical Education along with the students to check whether they will be able to meet systemic, relational, demands. We find such a didactics conception in the current discussion about approaches of a "teaching open to experiences" (HILDEBRANDT-STRAMANN, 2009) and approaches of critical-emancipatory teaching (KUNZ, 2010). The systemic idea is that both didactics concepts pursue the

educational goal of self-education, in which learners should relate through movement to the social and material world in order to discover the meanings of the world movement. To achieve these two objectives in a class of Physical Education, it must be planned in a way that students have possibilities of codecision about the teaching objectives, the contents and the teaching methods (HILDEBRANDT-STRAMANN; OLIVEIRA, 1994). Next, we will relate the idea of a relational understanding of teaching to the aspect of motor learning and explain it briefly.

Just as the scientific-natural paradigm of movement, for example, has its consequences in the configuration of teaching, the phenomenological paradigm of movement has its consequences here as well. We learn special forms of movement or instructions of movement not by the teacher's explanations, but only through a dialectical game between stimulated forces and activated forces. These forces determine the possibilities and limits of correct action. The special form of movement takes shape only in the dialogical process with things in the world. The form is not previously present, but is the result of the process of this dialog.

In the learning process, that is, in the development of an appropriate form, a meaning for a correct or wrong movement execution is developed. We understand that we, as Physical Education teachers, have the task of making our students at the university and our students in the schools responsible for the search for information that can only be found through experimentation. They must search for movement characteristics that are determined by sensations. From the theory of motor learning, which is based on Gestalt theory, or perception theory, we know that no one can take away from the apprentices the search for this kind of information. Exactly here lies the movement theoretical foundation for a class open to Physical Education experiences (HILDEBRANDT-STRAMANN, 2009; KUNZ, 1991, p. 190). These theories are not oriented towards the configuration of teaching-learning processes in an objective technical structure of movement, but rather consider the subjective structure of action and the exchange of relationship between human beings and the environment. We call this conception "global" or "systemic" because it relates man to the world and vice versa. This is a characteristic foundation of human existence, which Merleau-Ponty (1966) perceives as "being for the world". We also find this indissoluble relationship in the Gestalt circular model (WEIZSÄCKER, 1966). Here, perceiving and moving are a unity. In Meinel and Schnabel's (1984) morphological theory of movement, there is a separation between sensitive aspects (of the analyzers) and motor aspects (the motor centers effect). According to Meinel and Schnabel (1984), the two are in a causal context (TREBELS, 1992, p. 340).

In contrast to this, Gestalt theory does not state a causal context of the sensitive system and the motor system, but rather of a coincidence. Coincidence means – and this is what characterizes Gestalt – that perceiving happens at the same time that moving happens and vice versa. The perception influences the movement and vice-versa.

This unity of moving and perceiving corresponds, in the training process, to the meaningful context of "feeling" and "achieving". In motor learning theory people talk today of an "effect-controlled movement learning". According to this, the so-called "stimulus-response-effect-relations" are the basis of motor control and motor learning (SCHERER, 2018, p. 197). The combination of feeling and achieving will emphasize the relationship of the internal context to the external context of the individual, of the movement in its perceptions and of the movement situation in its own movement action. The motor learning problem is to learn to feel ourselves in the execution of the movement, in the most differentiated way and in relation to the situation, starting the movement process so that the excess and lack of energy can be balanced step by step.

## Conclusion

The starting point of this article is a “plaidoyer” for a systemic thinking in the context of Physical Education teacher training. For this, it is necessary to overcome the atomistic-analytical approach that predominates in current curricula. Based on general considerations about systemic paradigm, a curriculum model is presented in this article, both structurally and systemically.

The modularized curriculum proposal also has other features of a systemic approach, which cannot be dealt with at this point. But finally, we would like to briefly touch upon an important feature: the connection between theory and practice. Traditional curricula for Physical Education teacher training make a clear distinction between theory and practice. Theory includes areas of sports science such as “sports physiology”, “anatomy”, “training theory”, “sports medicine”, “sports sociology”, “sports education”; practice includes training in sports disciplines such as athletics, swimming, soccer, handball, volleyball, basketball etc. In the modularized curriculum, two strategies to overcome this separation are proposed:

1. Practical training is structured in Fields of Experience and Learning. This structuring means not determining the world of movement from the beginning for sports meaning. The world of movement contains a multitude of meanings, which can and must be discovered by students and by pupils in schools. This also means that sports meaning cannot be eliminated from teaching. But this meaning is just one among others. At the same level of the sportive meaning of movement are the expressive, explorative, sensitive, communicative and productive meanings. For this reason, it is also important that the didactics procedures are guided by the conception of “lessons open to experiences” (HILDEBRANDT-STRAMANN, 2009).

2. Each module includes a practical seminar from the Learning and Experience Campus offered in modules 6C and 3BED. The intention is that the teacher responsible for a module connects the practical seminar to the module topic. For module 2BED, described above, this would mean, for example, planning the Experience and Learning Campus “running, jumping and throwing” didactically, so that students experience the practical realization of movement – the interdependent connection between an understanding of movement, education and teaching. Thus, they can reflect, in the seminar on the didactics differences, on a lesson setup with the theme “running, jumping and throwing” according to natural science theory, or phenomenological theory, and to dialogical movement theory (HILDEBRANDT-STRAMANN; HATJE; PALMA; OLIVEIRA, 2020, p. 47-53; KUNZ, 2010).

## Notas

## Endnotes

<?> Presented in the didactics discussion in Brazil by Trebels and Kunz (2010).

<?> Tamboer calls this conception of the body as “relational” (TREBELS, 1992, p. 341).

<?> Dialogical theory is also a decisive theoretical basis for university formation in the movement fields of module 6C and 3 BED: 1. moving without and with apparatus (gymnastics) 2. fighting (martial arts), 3. capoeira, 4. playing, 5. playing in teams, 6. moving in water, 6. running, jumping, throwing, 7. caring, sharing, opposing (see figs. 1 and 2).

<?> Plaidoyer: to plead in favor.

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