Original article

The formation of the physical education professional: teaching the discipline of human anatomy

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Abstract

The aim of this work was to understand how the discipline of Human Anatomy is taught during the formation of the Physical Education professional, nine teachers who work at universities in São Paulo and its metropolitan area were observed and interviewed. The main characteristics observed during these teachers' pedagogic actions were gathered in an analytical matrix aiming at understanding the established phenomenon. After the associations were established between the procedures carried out by the analyzed subjects and the theoretical foundation proposed by David Ausubel's Theory, it was observed that this discipline is developed without considering the essential elements that allow the Significative Learning and, therefore, it has been collaborated little for the professional formation, as it adopts a pedagogical model based on contents represented by the accumulation of information disconnected from the reality and the academic and professional needs that are associated with Physical Education.

Keywords: human anatomy, physical education, teaching.

1 Introduction

Human Anatomy can be defined as the science that studies the shape and the structure of the human body and the associations established between its parts (JACOB, FRANCONE and LOSSOW, 1984; LATARJET and RUIZ LIARD, 1993; SOUZA, 2001).

In some ways, Human Anatomy can be considered part of the search for the understanding of mankind's wholeness in its universe, as the anatomical studies have been carried out not only by physicians, but also by philosophers and artists.

However, eventually, the history of mankind has shown that the process of systematization of knowledge that forced on Education the role of placing Man in a formal process of construction of knowledge, unfortunately also, in time, contributed to the compartmentalization and the limitation of human thought. That reflects on Medical Science, which adopts the study of Human Anatomy and other disciplines that participate in the formation of the physician, with a biologicist focus, directed at the study of the diseases, consolidating the trend towards specialization and hyperspecialization, which do not take into account the sociohistorical aspect of the human being (LUNA and MUÑOZ, 2000).

Being apart from the meaning of the collective, Human Anatomy was a victim of this process, although it did not cease being an important aspect to understand Man and its culture, as well as the arts, mathematics, politics and the religions (WILLIAMS, WARWICK, DYSON et al., 1995).

In a contemporary point of view, Souza (2001) presents Human Anatomy as an important discipline, not only for Medicine, stating that its basic knowledge are fundamental for the formation of physical therapists, pharmacists, biochemists, nurses, nutritionists and physical educators. However, when talking about the importance of this discipline, the author maintains the point of view that emphasizes aspects connected to the professional intervention in individuals affected by some disease. That becomes more evident when the author states the importance of the discipline for the physical therapist:

> [...] This knowledge is crucial for the understanding of patient assessment technique, disease mechanisms and treatments [...] (SOUZA, 2001, p. 4).

Based on Souza's statements (2001) on the importance of Human Anatomy in the formation of different professionals and also on the professional experience of one of the authors as a Human Anatomy Professor in a Physical Education course, questions arose on the objective of the classes of this discipline in these courses: Is the study of Human Anatomy significant in the Graduation Courses of Physical Education? Do teachers inform the students about what will be studied and the objectives of that study? Do the teachers organize the presentation of the content following an increasing complexity level, taking into account the importance of students' knowledge during the teaching-learning process? Are the contents associated with the possible practical use in the students' daily routine? Are the classes seen as a time when pragmatic questions are discussed in order to correlate the contents of the discipline Human Anatomy with the daily events of Physical Education? Is the teacher of Human Anatomy aware of his/her role of facilitator in the process of attribution of meanings to the knowledge produced during the teaching-learning process? Are institutions and teachers concerned about the didactic processes in College education?

In view of so many questions, the aim of the present study was to understand how the discipline Human Anatomy is taught during the formation of the Physical Education professional.

2 Material and methods

Considering the conditions and the objective of the study, we decided to choose a modality of research that would allow us to study in depth the understanding of the capability a teacher needs when teaching Human Anatomy, so that the discipline will collaborate with the process of formation of the Physical Education professional.

The qualitative method showed to be adequate for this study, as according to Martins and Bicudo (1989), the phenomenon is complex with regard to its social and cultural context, which demands from the researcher an immersion into the context of the phenomenon through an interpretative perspective of what is observed and through recordings and analyses of the real and subjective interactions of the perception on how the phenomenon manifests itself, which for Thomas and Nelson (2002) occurs through the interaction of personal experiences that are inherent to those who perform the action and its unique constitutive characteristics.

We chose an exploratory, interpretative and non-experimental approach, in which the data are collected through observations and verbal representations. The researcher takes on the role of interpreter of reality through the analysis of the content, where behavioral and verbal patterns will be detected based on the data supplied by the studied phenomenon (MARTINS and BICUDO, 1989; THOMAS and NELSON, 2002).

The sample consisted of nine teachers of Human Anatomy (who will be referred to as subject 1 and so forth, successively, until subject 9), who teach classes at the Physical Education courses in seven private Colleges/Universities, which will be referred to as uni-1 and so forth, successively, until uni-7, in the city of Sao Paulo and its metropolitan area. Of the total number of teachers, two have degrees in Physical Education, two have degrees in Physical Education and Physical Therapy, one has a degree in Physical Education and Dentistry, one has a degree in Physical Education and Biology, one has a degree only in Dentistry, one has a degree in Biomedical Sciences and one has a degree only in Biology.

The difference between the number of subjects and institutions is due to the fact that in uni-1 and uni-2 institutions, two teachers work together when teaching the discipline.

All of them signed the Free and Informed Consent Form and the study was approved by Ethics Committee in Research of Universidade São Judas Tadeu.

The observation of theoretical and practical classes was carried out with the objective of collecting information to better understand the teaching process regarding the attributes of Significative Learning, as we aimed at verifying the presence or absence of its components during the development of these classes and, when present, whether they occurred intentionally or not. The studied aspects were: whether the teacher informed the students about the objectives and goals of the class, whether the teacher sought concepts present in the cognitive structure of students in order to use them as anchoring points for new knowledge, whether the content was presented in a progressive form regarding its complexity, whether strategies and examples were used that contained elements directly associated with the academic and professional needs of the Physical Education area. The didactic-pedagogical procedures adopted by the teachers were noted down in field note book.

The observed classes generated a report that synthesizes the observation of the theoretical and practical classes, which has the descriptions of what was observed regarding the didactic-pedagogical procedures adopted by the teachers.

To collect these data during the theoretical classes, the researcher sat at a desk situated in a row close to the wall; this place was chosen as it allowed better observation of the classroom and the teacher's actions. During the practical class, the researcher sat in a place that allowed the observation of the practical studies. As each laboratory has its own characteristics, the choice of places for observation was determined in a way that would allow minimal interference on the part of the researcher in the group's routine. We chose to observe the classes first and then collect the verbal reports from the teachers, as we believed that if the teacher's reports were collected before the observation of the classes was carried out, that would compromise their spontaneity and could induce actions to meet the requirements of Significative Learning by the teachers.

2.1 Significative learning

In order to define the reasoning when seeking out answers to the questions, we used the theory proposed by psychologist David Ausubel, main representative of Cognitivism, who recommends that learning needs to be significant so that the student can, in fact, transfer the knowledge constructed in class to the different personal and professional situations he or she will be exposed to. Thus, Ausubel defines meaning as the idiosyncratic, conscious and articulate content that was substantively and non-arbitrarily learned, which is correlated and transforms the individual's cognitive structure and manifests as a by-product of Significative Learning.

According to Ausubel (2003), the learning process in the classroom is associated with the acquisition, retention and use of a large volume of significant information associated with the several disciplines.

This theory, according to Moreira and Masini (1982), defends that the attribution of a new meaning to knowledge is a personal process, which involves associations and interactions between concepts and propositions present in the cognitive structure of the individual as a potentially significant content. Therefore, as the cognitive structure of each student is unique, all the new acquired meanings are also, obligatorily, unique (AUSUBEL, 2003).

Therefore, the Significative Learning is, for the student, the attribution of new meanings to his/her cognitive structure and these meanings, therefore, are the final product of Significative Learning.

2.2 Process of attribution of meanings

Man attributes meanings when the new concept makes sense to himself, when the potentially significant material establishes associations that are substantive and not arbitrary, with his cognitive structure and, moreover, it allows the ordination of facts in conceptual categories that gather common attributes capable of promoting the assimilation and transference of consciously differentiated contents. Thus, it is consciousness, through intentionality, that attributes meanings to objects, phenomena, situations and actions of individuals (MOREIRA and MASINI, 1982).

And this intentionality, for Ausubel (2003), demands from the students a will and attitude that allows establishing associations between their structure of knowledge and the new material to be learned, also in a non-literal and non-arbitrary way.

In opposition to Significative Learning, David Ausubel defines the mechanical learning as the one where the new contents, propositions or symbolic materials are learned in an arbitrary and literal way, with little or no association with the existing concepts in the cognitive structure of the student, being volatile, with low retention of knowledge in the mid- and long-term. This type of learning requires less effort on the part of the student, prioritizes the accumulation of a large volume and variety of information, to the detriment of reflexive thought. Thus, the student assumes a passive role in the presence of knowledge that is arbitrarily transmitted by the teacher (MOREIRA and MASINI, 1982; TAVARES, 2004).

In this sense, Masetto (1996) states that, to promote Significative Learning, it is necessary, in addition to the technical knowledge of the specific content of the discipline, a receptive posture on the part of the teacher. The latter must enjoy teaching and want to do so, in addition to being open and willing to reflect on his/her actions and apply concepts, theories and techniques based on the reflection on the teaching-learning process. It is also necessary for the teacher to see the student as a partner in this process, as a subject that is co-responsible for the learning, allowing their lives to take part of the classes and contents, conflicts, expectations, joys, fears, hopes, advances and stagnation to be worked out, that is, the inclusion of everything that constitutes the individuality of student and teacher.

Thus, when getting organized, the teacher must take into account the expectation of the students regarding the teaching institution and the class itself and consider that these students must learn in order to contemplate a full development as citizens. It is not about observing the expectations of the students in order to simply meeting their needs, but to use this knowledge to act based on them, as well as to promote changes that would allow an academic maturation.

Nista–Piccolo and Vecchi (2006) emphasizes the motivating character that the selection of contents and the choice of strategies have on the involvement and participation of students during classes. Thus, the strategies that favor the learning of a contextualized practical knowledge, directed at the integral formation of an individual capable of adequately answering the contemporary challenges through rationality and self-criticism, allow a continuous and permanent association between thought, will and action, at the moment of defining what the best ways for the teaching actions to be directed at Significative Learning (DIAS and LOPES, 2003).

3 Results

3.1 Characteristics of the human anatomy classes in the physical education courses

In order to understand the teaching approach of the teachers of Human Anatomy in the Physical Education courses, we observed, according to the attributes of Significative Learning (previous organizers, conceptual maps and anchor-knowledge), theoretical and practical classes in different private institutions (Colleges and Universities), given by teachers with different degrees in the healthcare area.

3.1.1 Observation of theoretical classes

During the theoretical classes, all individuals centralize the development of contents by using expositive classes, aimed at transmitting concepts and definitions regarding the studied organic systems and start the class by directly presenting the content, which must be, in turn, learned as literally as it is taught.

As the teaching is directed at the formation of Physical Education professionals, the musculoskeletal (locomotor) system is the main content of the discipline.

In general, no activities were developed that allowed the active participation of the students during the presentation of the content, as the students remained passive during the class development; however, we could observe that during the classes of subjects 2 and 3 (uni-2), the students presented a participative attitude, asking questions, exemplifying through situations that they had experienced themselves and exteriorizing the knowledge they already had regarding the studied subject. This fact allowed the teachers to use this previous knowledge as anchoring points for new knowledge. That was also observed concerning subject 6, who, even though was not acquainted with the Significative Learning theory, organized the class so as to include previous organizers and conceptual maps, seeking to learn what each one knew on the class topic and using this repertoire of knowledge already present in the cognitive structure of the students as a starting point to explain the content. The use of anchoring concepts was also observed.

In order to make the learning of Human Anatomy significant, most subjects, with the exception of subject 8, tried to correlate the content to some applied situation, such as: motor gestures associated to sports modalities and other areas of knowledge. Additionally, six subjects used clinical examples, such as possible lesions of the musculoskeletal system and in the different organic systems and one subject presented several video documentaries associated with human body function. However, the proposed association is superficial an does not allow a significant analysis on the part of the students in order to understand which structures are actually involved in the motor gesture and how this involvement occurs.

The teachers used overhead transparencies and a projector as illustration resource, using images obtained from the Atlas of Human Anatomy and the students followed the classes, in case of subjects 4, 5, 7, 8, and 9, using copies of these transparencies and other pictures from the Atlas of Human Anatomy distributed by the teachers, as booklets.

The theoretical classes are finished as soon as the teacher ends the description of the content and clarifies doubts and none of the subjects offers extra-classes activities for content consolidation or adds any type of information that contemplates the academic, daily or professional needs in Physical Education.

3.1.2 Observation of practical classes

The laboratory of Human Anatomy has anatomical parts ready for the classes, either natural or synthetic and the practical study conducted by all subjects aimed at the inspection and identification of the content presented during the theoretical classes. After arriving at the laboratory

and with the syllabus and Atlas of Anatomy in hands, the students organized themselves as conveniently as possible, and went through the parts to perform the proposed activity: identify, without the teacher's help, the structures described in the theoretical classes that were associated with the study program. The teachers go around the laboratory, observing the class and their intervention occurs when the student cannot locate or identify the anatomical structures.

When starting the class, the teachers tell the students how they must locate the structures and do not offer any complementary information or information relating the content to the students' academic and professional necessities and do not use any strategies that can direct the reasoning towards the construction of Significative Learning; at the laboratory, the exercise is of visualization and memorization.

The class ends and the teachers add no information or request extra activities to help students memorize the studied material or correlate it with Physical Education. The students leave the laboratory soon after having studied the anatomical parts and theoretically, memorized the associated structures in the practical study program. Regarding the memorization of the structures, it is supposed to have been achieved, as there are no activities that can verify the degree of assimilation on the part of each student.

The observations allowed us to characterize the classes of Human Anatomy according to two distinct moments: one highlighted by the theoretical study, in the classroom, where concepts and definitions of a certain part of its content are presented to the student and another, which consists of the practical study, carried out at the laboratory and aims at allowing the students to recognize and identify what has been described by the theory, through the visualization of anatomical structures.

Therefore, during the practical classes, the students simply look at the anatomical parts and identify their structures, that is, they are not submitted to creative experiences that associate the specific content of the discipline and academic and professional questions related to the Physical Education course. There was an association between the content presented at the theoretical class and the visualization of the anatomic parts observed in practice; however, there was no articulation between these experiences, as the teachers did not act, during both the theoretical and practical classes, as mediators and mentors in situations of learning that could lead the group and each subject to reflect about the exposed phenomenon and they did not explore the possibility of promoting a deep analysis that would contemplate the content of the discipline as being part of a mutually determinant continuum between their specificities and the academic and professional needs of Physical Education.

Moreover, the teachers did not plan their classes considering the importance of the previous organizers, conceptual maps and subsunsors or anchor concepts and subject 6, in a way, presented these elements, but did so unintentionally.

It was also observed that the classes have been structured in the same way since the compartmentalization of knowledge that generated a biomedical paradigm and bequeathed a biologicist focus to the formation of professionals from the healthcare area. The content was and still is being presented in a expository manner, isolated from the professional and academic reality, without establishing associations with the subject's actions when he or she enters the work market, with the other disciplines in the curriculum and with his or her development as a citizen. In this sense, there is a disequilibrium in Brazil regarding the professional formation that fails to explore the characteristics that are inherent to the human being, privileging the technical formation.

Stacciarini and Esperidião (1999) and Moreira and Masini (1982) corroborate these observations by stating that from the point of view os teaching strategies, the exercise of being a teacher in graduation courses is a traditional one, characterized by the mechanical learning where new contents, propositions or symbolic materials are learned arbitrarily and literally, bearing little or no relation to the concepts that exist in the cognitive structure of the student, as the teaching techniques are repetitive and the classes are, almost always, expository ones, with the consequent unilateralism of the communication and the confinement of critical thinking on the part of the student.

In this context, in order to understand the essence between theory and practice in the Human Anatomy classes for the courses of Physical Education, these concepts can be conceived in two basic ways: as dichotomous or as units. The dichotomous view of the association between theory and practice suggests total autonomy between them, where theory and practice are isolated elements and even opposed ones. However, in the integrative associative view, theory and practice are separated extremities, but not opposed ones, as they establish a reciprocity association where theory is not a closed knowledge, but a permanent reconstruction of its propositions through the reflection about the established phenomenon that is presented and practice, as the result of the actions of determined historical processes and the determinants of Man's actions; thus, the theory-practice relationship must be understood as a mutually determinant continuum (SOUZA NETO, CESANA and SILVA, 2006).

Considering the emerging paradox between the models of the theoretical classes that disregard the context of which the student is a part of, and practices that do not offer opportunities for creative and dynamic actions, a question arose on the objectives of the classes of Human Anatomy. Would it be only the visualization of structures or could it become a more significant act, by associating these contents to the possible applications on the daily life of the students? Could the theoretical and practical classes be seen as a moment during which pragmatic questions are discussed in order to correlate the content of the Human Anatomy discipline to the daily life events in Physical Education? How can the teachers of Human Anatomy acquire a didactic basis in order to promote the Significative Learning for their students?

4 Discussion

4.1 The role of the teacher in view of the possibilities of contextualization of human anatomy considering the academic and professional needs of physical education

In order to promote the teaching of the Human Anatomy discipline with the objective of collaborating with the formation of the Physical Education professional, we

believe that the teacher must be capable of teaching the classes using a teaching approach that can be understood as a set of attitudes, procedures, postures and values that will lead him or her on a search for elements that can contextualize the new content to be taught to the academic, professional, emotional, psychological, cultural, political and religious reality of the students. The teacher must consider the adequate selection of the content in order to promote this contextualization, taking into account: the hierarchic organization of concept presentation; the selection of materials to be used, the teaching and evaluation strategies to be adopted; the search for students' previous knowledge that can be used as anchoring elements for the new elements; the respect towards the idiosyncratic nature of learning; the continuing formation; the deep and significant knowledge of questions related to the discipline and educational theories.

Therefore, the contextualization of Anatomy to the fundamental characteristics of Physical Education requires the learning to be significant, to occur through a process that involves the intentional action of the individuals involved in the educational dynamics to articulate the knowledge they already have with a new knowledge that they wish to build on and incorporate.

This type of cognitive structuring is characterized by a idiosyncratic process that occurs through a sequence of events loaded with personal senses present in the teaching-learning process which, in turn, recognizes that the more a person is exposed to a potentially significant instructional material, the higher the possibility of significantly learning the content and learning the essence of this new knowledge in order to use creative, critical and transforming attitudes (MOREIRA and MASINI, 1982; MASETTO, 2000; TAVARES, 2004).

However, studies such as the one by Stacciarini and Esperidião (1999), verified that the teaching in College/ Universities is connected to educational actions focused on a teacher who is supposedly the source of knowledge and a student body that does not question much, incapable of self-management and that needs to be conducted. This tutelary condition turns the teaching-learning process into a moment of dissemination of information on a fixed content to a passive student who memorizes this content, a subject-object fated to reproduce the knowledge that originated from a mechanical learning (MASETTO, 1996; STACCIARINI and ESPERIDIÃO, 1999; ESPERIDIÃO, MUNARI and STACCIARINI, 2002).

This reality of the educational process presents, very often, little differentiated classes regarding the social and personal complexity presented by each student; the teacher adheres to a verticalized, unidirectional educational process and the classes acquire the characteristic of a magisterial lecture, where the source of knowledge speaks to an audience that is there to passively receive what is transmitted, thus disregarding the fact that all communication must have an interactive nature, with reciprocal actions and that the constant dialogue between the subjects that are part of the educational process effectively collaborates for the personal growth of each one and all (STACCIARINI and ESPERIDIÃO, 1999).

Luna and Muños (2000), when describing the teaching of Human Anatomy in Schools of Medicine in Cuba, illustrated with precision the model of magisterial lectures that have a biologicist focus. Focused on a teacher with broad culture regarding Human Anatomy, the didactic actions perceived in the Medical courses are based on empiricism that reproduces methods of teaching that characterize Anatomy as a dead science, which remains in the same state and place and the classes, as they present a descriptive and encyclopedic character, lead to a theoretical, descriptive and memoristic learning, where the practical study of the discipline is only attained through the dissection of dead bodies. This kind of learning situation proposed by the teacher is not capable of dealing with education as if it were a human, historical and multidimensional phenomenon and makes it difficult to develop multiple implications and associations that the human and technical dimension present during the teaching-learning process (MIZUKAMI, 1986; PERRENOUD, 2000).

According to Fornaziero and Gil (2003, p. 143) "[...] the specific reflections on the teaching of Human Anatomy are, in general, uncommon [...]". Thus, the investigations did not find studies that had discussed the theoretical foundation related to the educational aspects associated with the teacher of Anatomy for the graduation courses in Physical Education, and hence, we had to resort to studies carried out involving Medical professionals.

Nevertheless, recent studies carried out by the Medical area, have demonstrated that although Anatomy has not altered, the technological development has collaborated to implement new methods of study for this discipline, presenting itself as an element of learning facilitator by offering a higher range of resources that stimulate the students' involvement in the learning process (PRADO, OLIVEIRA, SILVA et al, 2006).

Fornaziero and Gil (2003) state that, considering the technological evolution, which is part of the daily life of students, the teaching-learning process requires changes in pedagogical practices, so that the teachers' actions can match the contemporary reality. This technological innovation starts to demand from the teacher new knowledge and constant adaptations, so that classes can be planned and will allow the student to be part of an educational process actively and reflexively.

It was observed that some teachers started to use technological apparatus (mainly multimedia projectors and the Internet), in an attempt at renewal and to facilitate the learning of the content of the Human Anatomy discipline. However, the classes maintained with the same format, without a real meaning for the students, who, in spite of acknowledging the importance of the discipline in their formation, did not establish a direct and immediate association between the content presented in class and their academic and professional needs.

It seems that this reality can be seen in College/ University education in general, as Masetto (2000) points out to a situation where teachers maintain the technique of expository classes and the use of new technological apparatus appear as a simple substitution of the chalkboard and chalk by transparencies or multimedia projectors and data presentation programs.

Considering this theoretical information, when associating the observations in theoretical and practical classes contained in the aforementioned picture, with the didactic-pedagogical basis of the adequate teaching action to promote Significative Learning, we can affirm that the teaching of Human Anatomy in the Physical Educational courses does not

meet the academic and professional needs of this area of knowledge. Teaching continues to be a phenomenon, very often decontextualized from the academic and professional reality of Physical Education.

We can also affirm that the pedagogical model is based on the mechanicist teaching and that the learning is arbitrary, literal and cumulative. The teaching actions are characterized by verticalized relations between the teacher and the student; the classes, expository and memoristic, basically continue to follow the paradigm centered on the content, of accumulation of information decontextualized from reality and the academic and, in the future, professional needs of the students, thus privileging the technical formation.

Nonetheless, if the theoretical and practical classes could advance on this model and establish relations with the professional actions in Physical Education, if they could somehow, based on their attributes, facilitate the understanding that the human body (and each human body) discloses the fundamental nature of each individual and each group, we could have a really integrative Human Anatomy teaching, favoring a view that would reveal the body as the conduit of relationships between the Being and the world.

For that purpose, Betti, ICR. and Betti, M. (1996) suggest the construction of a curriculum based on the reflexive practice, so that the repertoire of knowledge is formed by interactions between the theoretical and practical content and the reality of professional practice.

Therefore, through a dialectic association between theory and practice, sports modalities such as basketball and soccer, or even gymnastics and dance, for instance, would be discussed from the point of view of the anatomic aspects at the same time that their sociocultural context, and their fundaments, rules, tactics, as well as their meaning and characteristics in the several segments of the market, such as schools, gyms, clubs, either in groups or individualized treatment, would be learned.

This dialogue, when maintained during the course, can turn this "basic discipline" into something really significant since graduation, as it establishes contact with the contents related to the student's reality, which facilitates learning, the acknowledgment of its importance and the incorporation of its attributes (BETTI, ICR. and BETTI, M., 1996; NISTA-PICCOLO and VECCHI, 2006).

Therefore, the dialectic association between Physical Education and Human Anatomy can favor the construction of a profissiographic profile that meets the guidelines created by the Federal Council of Physical Education (Conselho Federal de Educação Física - CONFEF) which, among other aspects, guides the procedures and ethical attitudes that allow the Physical Education teacher to respect the characteristics of the population or individual he or she will work with (SILVA, COSTA, MIRANDA et al., 2006).

According to this regulatory organ, it is the responsibility of the Physical Education professional, supported by the scientific study and the repository of conceptual, theoretical and procedural knowledge, to guarantee the good performance of activities related to the practice of physical activities for children, young adults, adults and elderly individuals, offering adequate interventions that can guarantee the physical, moral and social integrity of these citizens (SILVA, COSTA, MIRANDA et al., 2006).

5 Conclusion

Based on the analyses and discussions presented in this study, we observed that the complexity of the educational process requires a series of combinations and interactions between the contents of learning, the teaching techniques and the subjects involved in the process.

The contextualization of the Human Anatomy discipline to the academic and professional characteristics of Physical Education is necessary, so that the Significative Learning of its content can take place.

Therefore, the results presented by the pedagogical model focused on the content, of accumulation of information decontextualized from the reality and the academic and professional needs involved in Physical Education and Human Anatomy allow us to state that this discipline has collaborated very little to the professional formation, as it offers the students a possibility of learning that is literal and arbitrary, to the detriment of the acquisition of knowledge in a considerable and significant way, constructed from critically-supported actions and attitudes and deeply reflected upon.

The teachers do not use the attributes of Significative Learning when planning their classes, or associate the contents to the academic and professionals needs of the Physical Education area. The classes are expository and traditional in nature and highlight the mechanical learning.

Therefore, we can state that Human Anatomy is taught at Physical Education courses in a decontextualized form, making it difficult to assimilate and transfer its content due to a lack of identification of the meaning of what is being learned.

However, the possibility of considering and understanding the social, historical, emotional, psychological and organic meanings of the different morphofunctional features characteristic of each phase of life, as well as the possible effects of these features on the practice of physical activities, demonstrates that the Human Anatomy discipline has a potential significativeness which, when well conducted by teachers based on educational theories, who have strategic integrative knowledge and are capable of promoting the contextualization between the contents and the students' characteristics, can really contribute to the formation of Physical Education professional.

As they usually focus only on the teachers, the observations were not capable of verifying how well the students were capable of assimilating the content and transfer this knowledge to the different academic and professional demands involved in Physical Education, which suggests that further studies are necessary.

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