Graduate studies in Brazilian physical education: *the (fatal) attraction to biodynamics*

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Abstract

The present work aimed at the academic characterization of physical education in Brazil. First, a parallel was made between the history of academic characterization of physical education in North America and in Brazil. Next, the analysis of the areas comprehended by graduate study programs was carried out in the field around Brazil. A survey was done considering the field of concentration and its interface and links with the size of faculty, with research lines and with research projects. Physical education *is the most preferred term to name the majority of the Brazilian graduate programs in contrast with the United States where* Kinesiology *is preferred. The analysis of the field of concentration yields three main subfields: biodynamics, sociocultural and pedagogical. Biodynamics takes precedence as one considers the size of the faculty and the number of research lines and projects always greater than the same variables in comparison with sociocultural and pedagogical subfields. This hegemony reflects a trend in which natural sciences–oriented research is privileged over human and social sciences–oriented research and difficulty in valuing the intervention, especially in schooling. This portrait resembles what happens in the US as some North American scholars from the sociocultural and pedagogical subfields have also identified difficulties in making their theoretical and methodological conceptions compatible with the hegemonic modes of thinking and investigation in kinesiology.*

Keywords

Physical education – Kinesiology – Biodynamics – Scientific policy - Graduate studies

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Physical education has diverse ends (educational, health, sport, leisure), though it is thought to be pedagogical in essence (BRACHT, 2003, 2007). As a field of knowledge, physical education is relatively young and controversial with an enduring debate over the subject matter, the field's affinity with the natural sciences and human and social sciences, academic and scientific legitimacy, its acknowledgment as a science or as a social practice and its place and role in higher education. The aim of the present paper is to discuss the academic orientation of graduate programs in physical education based on a survey carried out on accredited national programs. The thesis is that there is a trend to deny physical education as a social practice and as a field of knowledge that instigates the dialogue between diverse knowledge and practices, be it from education, from health sciences, from biological sciences or from social and human sciences.

The academic characterization of Brazilian physical education

The course of Brazilian physical education in the 1980s resembled somewhat to events in North America in the early 1960s. North American universities were under a thorough review and the academic status of many departments, physical education among them, was questioned. At this time, Franklin Henry, head of the physical education department at UCLA, made a famous speech in defense of physical education as a legitimate academic discipline and the knowledge taught in undergraduate course resulted from research done in the field (HENRY, 1964). Henry spoke of physical education as it was at UCLA at the time (PARK, 1994) and argued that physical education could be seen as a science with a proper subject matter—human movement—and research methods adapted from traditional fields such as biology, psychology, education and sociology. Rarick (1967) elaborated on the subdisciplines that would form the core of the academic discipline such as exercise physiology, growth and motor development, motor control and learning, sport psychology, sport sociology and sports history, among others. These ideas triggered what became known as the disciplinary movement with a gradual transformation of many physical education departments into kinesiology or exercise science departments (cf. NEWELL, 1990).

In Brazil, the academic characterization of physical education was somewhat influenced by the North American movement[1]. The start was when some Brazilian universities began to create graduate study programs in the field. The first graduate programs in physical education[2] were established by the end of the 1970s and early 1980s. However, only the Federal University of Santa Maria showed a preoccupation with academic field naming its program Science of Human Movement organized around a set of subdisciplines (biomechanics, exercise physiology, motor learning, growth and development, etc.). Programs in other universities adopted the term Physical Education and their courses were extensions from traditional fields such as education and biology.

Since 1990, the accreditation system established by CAPES[3] began to value the extent to which graduate programs had clear and consistent academic characterization considering study themes, research lines, research projects and student activities (seminars, courses, disciplines). The differences in this respect were great among programs

1- Between the 1970s and 1980s, a group of physical educators working at federal and state universities received scholarships sponsored by the Brazilian government to pursue master's and doctoral degrees in physical education at North American universities.

2- Universities offering master's degrees in physical education were the University of São Paulo, the Federal University of Rio de Janeiro, and the Federal University of Santa Maria.

3- CAPES stands for Coordenação de Aperfeiçoamento de Pessoal de Ensino Superior, a division of the Ministry of Education engaged in setting policies and guidelines for the Brazilian system of Higher Education at the graduate level.

which was often interpreted as lack of identity. By this time, a discussion started on the academic characterization as is expressed in a series of publications. Some initiatives intended to stimulate discussion inside graduate study programs, as in the case of the journal Motus Corporis[4] whose editor invited three scholars with different views to write on physical education as a field. For Hugo Lovisolo (1996) physical education was not an academic discipline; rather, it was better seen as an art of teaching that benefits from knowledge of different sorts, scientific and non-scientific. In contrast, Go Tani (1996) remarked that physical education was an academic discipline that investigated human movement; hence, physical education should be renamed kinesiology along the lines proposed by Newell (1990) years earlier. Mauro Betti (1996) was in between as he defended that physical education is mostly an intervention field with a pedagogical orientation, though as such physical education should develop a theory of its practice on solid scientific grounds.

Still other publications expanded the debate in different directions, though in most cases there was considerable controversy over changing physical education into a "science of movement." For example, the journal Movimento[5] launched the question "What is Physical Education?," and various scholars reacted to that and expressed views rarely convergent on the epistemological basis of the field (for example, GAYA, 1994; TAFFAREL & ESCOBAR, 1994; BRACHT, 1995; LOVISOLO, 1995; SANTIN, 1995).

Bracht (2003) reflected upon the fascination that the view of physical education as a science exerted on the academic community and the problems this might have for the developing field. The attraction for the scientific side of physical education led the field to distance itself from pedagogical intervention. Bracht argued that, when physical education assumed the rhetoric of science, the field converted itself into the hegemonic mode of doing science (strictly speaking, natural science), further distancing the field from pedagogical research and practice.

By the second half of the 1990s, a gradual change had occurred in the way graduate study programs were structured. The term Physical Education was kept but inside each program different concentration fields were proposed inspired by a disciplinary view of physical education. Each concentration field corresponded to a subfield, three were identified: biodynamics, sociocultural and pedagogical. Biodynamics encompassed the research activities within sub-disciplines such as exercise biochemistry, biomechanics, exercise physiology, motor control, motor learning and development, apart from some applied ones such as nutrition and sports training. The line of investigation in biodynamics is oriented by the natural sciences (ABERNETHY, KIPPERS, MACKINOMON, NEAL & HANRAHAN, 1996; AMADIO & BARBANTI, 2000). The sociocultural subfield gathered researchers investigating issues grounded in social and human sciences, treating themes such as sport, bodily practices and physical activity from the point of view of sociology, anthropology, history and philosophy. The pedagogical subfield included scholars concerned with teacher preparation and methodological, social, political and philosophical issues of education distributed in disciplines such as curriculum development, teaching methods and sport pedagogy. The sociocultural and pedagogical subfields set their lines of research oriented by social and human sciences. In this sense, physical education investigates in a close relationship

4- Motus Corporis was a scientific journal dedicated to publishing works produced within the graduate study program of the University Gama Filho (UGF), Rio de Janeiro, Rio de Janeiro State.

5- Movimento is one of the most important Brazilian scientific journals in physical education as the journal's editorial policy focuses on the publication of articles and essays grounded in the social and human sciences, allowing scholars and researchers from the socio-cultural and pedagogical subfields to present their studies and reflections. The journal is available online at www.revistamovimento.org.br.

with education (BAIN, 1995; BRACHT, 2006), sociology (BETTI, 2009), philosophy (FENSTERSEIFER, 1996; KRETCHEMAR, 1994) and history (SOARES, 1998).

In 1998, CAPES promoted a major change in the way graduate study programs were assessed with profound influences on how physical education's subfields within the programs were rated. The new assessment was meant to capture the level a program is to become international (concept 7). Evaluation committees in physical education began to adopt indicators used worldwide such as quantifying the number of papers published by faculty members in a given institution in journals with a high impact factor (FERREIRA & MOREIRA, 2002). Gradually, scientific papers became the most valued item in assessing a graduate study program. Papers were rated according to the journal they were published in, which in turn were judged based on quantitative measures developed and applied preferably by the Institute of Scientific Information (ISI). This institute generates an impact factor for each journal calculated from a combination of elements, such as how many times papers of a given journal are cited by other journals, how old the references cited within the paper are, etc. (GARFIELD, 1994). Other databases considered included MEDLINE, ERIC, Psychinfo, SciELO and LILACS. However, the lack of a widely accepted impact factor made the journals indexed in such databases to be undervalued in regard to those appearing in the Journal of Citation Reports issued by the ISI. This meant that the production of faculty members was qualified indirectly as the criterion adopted referred to the kind of indexation a given journal had and not on the quality of the papers produced.

The use of such an index to evaluate the quality of scientific production has received much criticism. Garfield (1983), the mentor of such a tool, argued that journal impact factors and the ratio of citations are all numbers that have meaning for information scientists but to simply apply these figures to other purposes such as those involved in tenure procedures for faculty members or for assessing the quality of intellectual production is a long way and may lead to wrong judgments. There are expressive differences in the impact factors for journals from different fields that do not mean quality differences among the journals. Citations need to be contextualized as some are self-citations (the author of a paper quotes his or her own work or citations occurring among researchers who collaborate), and other citations are done without any appreciation of the paper being quoted and made just for the need to cite some study on the theme reported by the paper. The widespread use of such impact factors causes great distortions in the evaluation of many fields, generally those related to social and human sciences (WATERS, 2006), and physical education is no different (CARVALHO & MANOEL, 2006; RODRIGUES, 2007).

Machado, Lourenço and Silva (2000) used the example of psychology to highlight the perils of such a rush for productivity. They argued that the expressive increase in the number of papers published each year (nearly 10,000) do not correspond to significant theoretical advances in the field. Most original papers report empirical studies that in many cases replicate only what has already been shown with different samples, different apparatus, and so on. Research labs resembling factories' assembly lines expose only the fragmentation that has split the field. Investigations that are conceptual and theoretical in nature have little space in journals due to their editorial policies that stimulate the production of factual research yielding a considerable number of papers.

This evaluation policy has installed an induction process in Brazil by which the academic characterization of physical education is governed by research themes that have the highest probably of being published in journals with a high impact factor regardless if these themes are significant and pertinent to the field.

Other obstacles to the growth of the area or some subfields include the number of journals indexed at the ISI is greater for the areas within the natural sciences than for those in the human and social sciences (GARFIELD, 1994). A similar relationship is found among the journals associated with physical education indexed at the ISI. More journals with a biological orientation are indexed at the ISI than journals that are oriented by social and human sciences (HOPKINS, 2001). The differences in the number of journals with different types of orientation lead to fields within the natural sciences presenting always higher impact factors than the journals in the social and human sciences (CORYN, 2005).

Assessment is fundamental in the process of building a field as well as for establishing common ground for different fields. However, assessment, depending upon the way it is managed, can and in fact does exert a normative and restrictive power. This has been the case for Brazilian physical education as assessment has privileged production that is biologically oriented to the detriment of the production of other areas, social and human oriented. Biological-oriented research has more opportunity to be published in journals with a high impact factor, improving the conditions for subfields grounded on natural sciences.

The majority of graduate study programs in physical education offer only master's degrees. Programs offering doctoral degrees are recent and few in Brazil. The first doctoral program began in 1990, and up to today, only nine higher education institutions are accredited to award PhD degrees, which is not sufficient considering the demand for professionals with master's degrees and the need for qualified human resources for conducting teaching and research in universities (KOKUBUN, 2003; LOVISOLO, 2005). With few changes in sight, those wishing to become PhDs in physical education have to choose between two pathways: one is to pursue PhD degrees in programs oriented mostly by biological and medical sciences in Brazil or abroad; another is to seek graduate study programs in education, philosophy, anthropology and history. The lack of balance between the number of graduate study programs offering doctoral degrees and the number of professionals wishing to obtain such degrees has a double effect for a young academic area such as physical education. The faculty members who got their PhDs from other fields have also gotten, at least in principle, a solid background in more traditional fields that might contribute to consolidating physical education. However, the research experience in other areas has meant that many faculty members of Brazilian physical education departments became involved with a research agenda that is not always relevant for physical education. Those coming back to Brazil after years of doing PhD work abroad start to conduct research without taking into consideration the necessary adaptations to the Brazilian reality (DANTAS, 2004).

Overall, a distortion has been generated in the way the field values its different research activities, i.e., privileging some and disregarding others. The impact of this process can be appreciated by surveying the graduate study programs in physical education in Brazil.

Brazilian graduate programs in physical education: a demographic analysis

The programs surveyed were those accredited by CAPES until October 2009 (see Table 1). Twenty-one programs are accredited,[6] the majority of which are located in the south (six programs) and southeast (10) regions of Brazil; the exceptions are two programs located in the central west of the country and one program in the northeast region. These data are available at http: \\

6- Since we wrote this paper, CAPES has accredited one more program (USJT) to offer a doctoral degree in physical education. This addition did not affect the overall picture we described for the field.

www.capes.gov.br/avaliacao, within the Great Area of Health, and then Physical Education in which all the accredited programs are listed. For each program, a set of documents is available concerning the program's mission statement, its lines and research projects, its faculty staff with a summary of their formation, research, teaching and supervising activities, and its curriculum of disciplines. These documents are for each year of a given period. We took the information available for 2006 because it was the most consistent and accountable as it corresponded to the last time a national survey (period 2004-2006) on graduate programs was conducted by CAPES.[7] There were some exceptions. Four programs that had recently been accredited by CAPES had no data available on CAPES's home page; hence, information about them was gathered on their home websites by October 2009.

The assessment of graduate programs in physical education is heavily oriented by the number of papers published in periodicals with the impact factor (indexed in one of the ISI databases) divided by the number of faculty members working in the program. The production published in Brazilian journals is undervalued irrespective of the scientific impact and social importance considering national, regional and local needs. Books are also undervalued; however, since 2005 a committee has been working with the duty of establishing parameters for evaluating book production within graduate study programs (cf. CARVALHO & MANOEL, 2007; CARVALHO, MANOEL, NOVAES, GUIRRO & BRACHT, 2008). In spite of the advances in assessing intellectual production in books, the production of papers still is the most current and valued item in assessing graduate study programs. This procedure causes tremendous distortions for evaluating intellectual production considering the concepts 1 to 7 are given on this basis. This scale reflects the scientific policy in regard to graduate studies in Brazil that privileges and instigate university institutions to aim for concepts 6 and 7. This would be logical if the criteria applied in the evaluation procedure did not suffer from a bias in which papers in journals indexed in the ISI receive higher points. Hence, research in the physical and biological sciences is most valued.

Physical education faculties at higher education institutions are possessed by a real obsession with becoming international, i.e., by getting concepts 6 and 7, and this has made them to turn their backs on research in socio-cultural and pedagogical subfields. In general, these research activities have a local, regional and national impact even though the scope of their content might not be of interest for an international journal. The main concern of researchers involved in this kind of study is to give answers to dilemmas facing Brazilian education and health, hence setting up a dialogue with colleagues who face the same cultural, social, political and economic reality. Internationalization is a social phenomenon affecting education in many ways, but this involves far more than publishing papers in international periodicals (NOGUEIRA, AGUIAR & RAMOS 2008). The impact of the internationalization policy will become evident in the way graduate study programs are distributed in Brazil (Table 1). Of the 21 accredited programs, 71.4% have Physical Education as their denomination. The term Sciences of Human Movement is used by 14.3% of the programs. Three institutions use distinct and unique terms: Sciences of Physical Activity, Sciences of Motricity and Sport Sciences. Issuing master's and doctoral degrees is possible in 47.6% of the programs; the remainder award only master's degrees.

7- CAPES has just finished the survey concerning the years 2007-2009, but the data and documents on this survey will not be available until later in the year.

TABLE 1 - List of graduate study programs accredited by CAPES with their respective concepts for master and doctoral levels

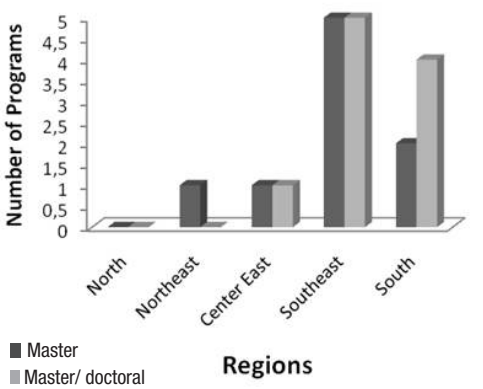
Academic denomination of graduate study programs	University	State	M	D
Sciences of Physical Activity	UNIVERSO	RJ	3	-
Sciences of Motricity	UNESP/RC	SP	5	5
Sport Sciences	UFMG	MG	4	4
Sciences of Human Movement	UFRGS	RS	5	5
Sciences of Human Movement	UDESC	SC	4	4
Sciences of Human Movement	UNICSUL	SP	3	-
Physical Education	UnB	DF	3	-
Physical Education	UCB	DF	4	4
Physical Education	UFES	ES	3	-
Physical Education	UFV/UFJF	MG	3	-
Physical Education	UFPR	PR	4	4
Physical Education	UFRJ	RJ	3	-
Physical Education	UGF	RJ	5	5
Physical Education	UFPEL	RS	3	-
Physical Education	UFSC	SC	5	5
Physical Education	USP	SP	6	6
Physical Education	UNICAMP	SP	4	4
Physical Education	UNIMEP	SP	3	-
Physical Education	USJT	SP	4	-
Physical Education	FESP/UPE	PE	3	-
Physical Education	UEL/UEM	PR	3	-

M= Master concept; D = Doctoral concept; see Appendix A for abbreviations.
(Source:http://www.capes.gov.br/avaliacao/cursos-recomendados-e-reconhecidos, accessed in October 2009.)

Physical education graduate programs are concentrated in the south and southeast regions (Figure 1). Doctoral degrees in physical education are awarded only by these institutions; hence, the majority of scholars with PhDs are concentrated in these regions.

One of the challenges for the whole system of graduate study programs in Brazil is to increase the opportunity for quality graduate studies outside the south/southeast axis. Today, the north region does not have a graduate study program in physical education, and the northeast region has only one program awarding master's degrees.

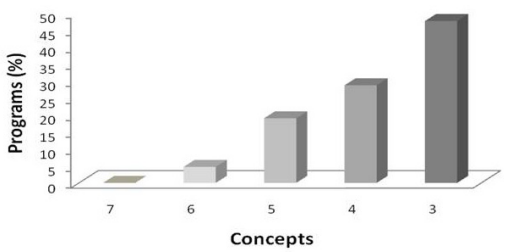
Figure 1 - Distribution of programs per level (master and master/doctoral) per Brazilian region.



Source:http://www.capes.gov.br/avaliacao/cursos-recomendados-e-reconhecidos, accessed in October 2009.

There is a concentration of programs (47.6%) with concept 3 (Figure 2). The number of programs falls sharply as the concept increases with only one program having concept 6 (4.7%). The skewed distribution suggests that more than one third of the area is not yet consolidated. This distribution may be taken as a result of the scientific policy practiced by the Brazilian government and the Great Area of Health, at CAPES, in which physical education is inserted rather than a picture of the quality of teaching and research activities currently being practiced in the majority of the programs. This policy has induced every higher education institution to follow the path of becoming international. Those who advocate this policy do that on the grounds of academic rigor. However, the distribution of concepts sees the application of criteria with total disregard to the diversity of the field. The consequence is privileging particular subfields, mostly those grounded in biological sciences, and disregarding others, such as those oriented toward education and sociocultural investigations.

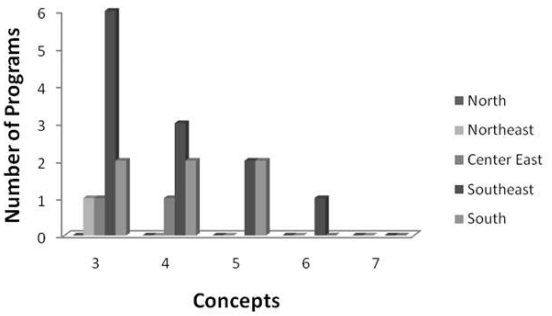
Figure 2 - Distribution of programs by concept.



Source:http://www.capes.gov.br/avaliacao/cursos-recomendados-e-reconhecidos, accessed in October 2009.

The distribution of concepts per region gives further evidence of the centralization of the scientific policy for the area (Figure 3). Programs with concept 3 predominate in all regions, though the predominance of programs with concepts 4, 5 and 6 occurs in the south and southeast regions. The only graduate study program in the northeast region has concept 3.

Figure 3 - Distribution of programs per concept and region in Brazil.

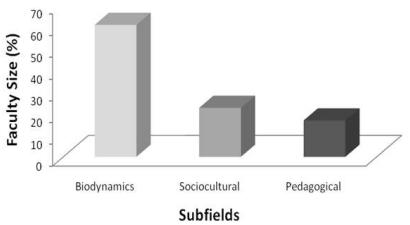


Source:http://www.capes.gov.br/avaliacao/cursos-recomendados-e-reconhecidos, accessed in October 2009.

The academic orientation of Brazilian graduate programs in physical education

The academic orientation of the programs was identified by surveying the size of the faculty and the number of research lines and projects associated with each subfield: biodynamics, sociocultural and pedagogical. The faculty members considered in this survey were those that each institution listed in its report to CAPES as being active members involved in teaching graduate classes, supervising master's and/or doctoral candidates and conducting research projects related to the concentration areas of the program. To define the academic orientation of the faculty members in a given program, we consider the area in which the faculty member got his or her PhD degree together with the research lines he or she is involved in the program and the research project he or she is currently responsible for (Figure 4).

Figure 4 - Faculty size in the biodynamics, sociocultural and pedagogical subfields.

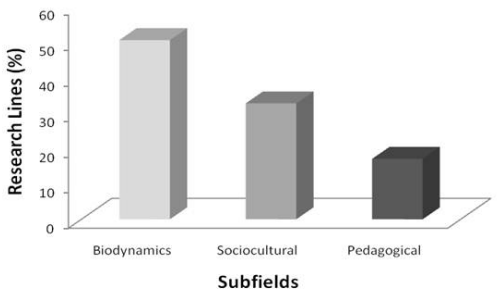


Source:http://www.capes.gov.br/avaliacao/cursos-recomendados-e-reconhecidos, accessed in October 2009.

There were 293 scholars working in graduate study programs in the field of physical education according to the 2006 survey. The majority work in the subfield of biodynamics (60.7% of all faculty members). The remainder are distributed between the sociocultural (22.52%) and pedagogical (around 17%) subfields. To take part in the graduate program, the faculty member must comply with the criteria set by a committee of the graduate school that in general follows the criteria practiced by CAPES to accredit programs. Hence, such distribution for sociocultural and pedagogical subfields results from a combination of factors: one is the predominant biodynamical orientation in graduate programs, and another is the accreditation criteria practiced within the programs.

Research lines can be considered one of the best indicators for the academic orientation of graduate study programs as the research lines characterize not only the specific themes that the researcher is involved in but also the research problems and the theoretical and methodological basis he or she elects as central to his or her activities. This allows identification of the academic orientation in terms of natural or social and human sciences. Each research line has in general two or more faculty members and comprehends a set of research projects that share the same theoretical background, level of analysis, methods and technique. Again, the hegemony of biodynamics is overwhelming. From a total of 135 research lines identified in all programs, 50% were linked to biodynamics (Figure 5). The sociocultural subfield had 33% of the total of research lines, and the pedagogical subfield had 17%.

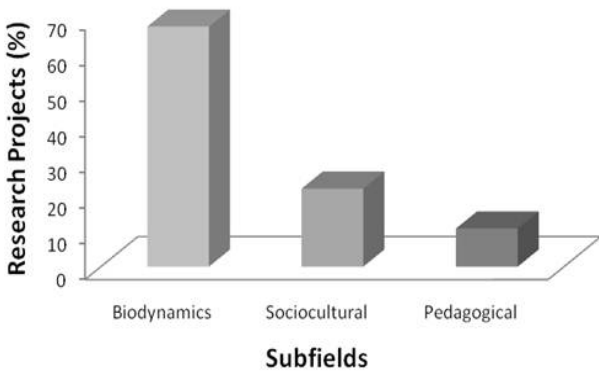
Figure 5 - Distribution of research lines among the biodynamics, sociocultural and pedagogical subfields.



Source:http://www.capes.gov.br/avaliacao/cursos-recomendados-e-reconhecidos, accessed in October 2009.

Research projects are more specific than research lines as the projects refer to particular problems, questions or hypotheses. In general, each faculty member may have two or more research projects under his or her responsibility. It is at this level that most graduate students are engaged conducting research projects under the supervision of faculty members. Of the 860 research projects being carried out in all programs of the field, 67.4% are in the biodynamics subfield (Figure 6).

Figure 6 - Distribution of research projects among the biodynamics, sociocultural and pedagogical subfields.



Source:http://www.capes.gov.br/avaliacao/cursos-recomendados-e-reconhecidos, accessed in October 2009.

Together, the sociocultural and pedagogical subfields have a little more than 30% of the total of research projects. In spite of some differences in the way a research project is conceived in each subfield, these data confirm the trend already presented with biodynamics being hegemonic in graduate studies. Although physical education is strongly related to intervention that is pedagogical in essence, ironically, research projects in the pedagogical subfield correspond to only around 10% of the total number of projects.

Twelve graduate study programs have biodynamics as their predominant subfield, which corresponds to 57% of the total number of

programs in physical education (Table 2). The concept a program has is associated with its orientation. For instance, with one exception, biodynamics predominates in programs with concepts 5, and 6.80% of these programs have biodynamics as the only subfield. Among programs with concept 4, 66.7% present a predominance of biodynamics in their subfields. In programs with concept 3, sociocultural and pedagogical subfields are predominant (more than 60%). In general, programs with the best concepts are those in which biodynamics is predominant. At the same time, as the concept decreases, there is a corresponding decrease of the presence of biodynamics in the programs.

TABLE 2 - Relationship between the presence of biodynamics in the program and its concept

UNIVERSITY	BIODYNAMICS (%)	CONCEPT
USP	72,7	6
UFSC	62,5	5
UGF	25	5
UFRGS	66,67	5
UNESP/RC	55,56	5
UDESC	66,67	4
UCB	66,67	4
UFPR	75	4
UNICAMP	50	4
UFMG	75	4
USJT	25	4
UNIVERSO	42,8	3
UNICSUL	100	3
UnB	66.67	3
UFES	0	3
UFV/UFJF	50	3
UFRJ	100	3
UFPEL	50	3
UNIMEP	40	3
FESP/UPE	50	3
UEL/UEM	66.67	3

Source:http://www.capes.gov.br/avaliacao/cursos-recomendados-e-reconhecidos, accessed in October 2009.

On the whole, all these data highlight the hegemony of biodynamics in the graduate study programs in physical education. This trend is also observed for the new graduate study programs, those accredited within the last three years. Most confirm the overwhelming presence of biodynamics, which many see as a condition for being accredited (Table 3). Fifty percent of these programs have only the subfield of biodynamics, and nearly the other half have a predominance of this subfield. There is only one exception to this trend.

TABLE 3- Relationship between the presence of biodynamics in new graduate study programs and their concepts

UNIVERSITY	BIODYNAMICS (%)	CONCEPT
UNICSUL	100	3
UnB	66.67	3
UFES	0	3
UFV/UFJF	50	3
UFRJ	100	3
UFPEL	50	3
FESP/UPE	50	3
UEL/UEM	66.67	3

Source:http://www.capes.gov.br/avaliacao/cursos-recomendados-e-reconhecidos, accessed in October 2009.

Final considerations

The impact human resources in higher education, science and technology have on society turned graduate programs into a very coveted place to be in the university. It is not surprising that universities, public and private, have devoted special attention to their graduate programs and wait with anxiety the result of every triennial assessment conducted by CAPES. Thus, graduate program proposals may be seen as the response universities, faculties and departments give to state policies. The proposals also result of internal and external struggles for academic hegemony. Graduate programs in Brazilian physical education are constituted by academic orientation grounded on Anglo-Saxon conceptions. Hence, there are some approximations between Brazilian and North American physical education.

In the US, the epistemological matrix underlying kinesiology is disciplinary. In Brazil, the situation is ambiguous as physical education is still the preferred term used by higher education institutions, and it is overwhelmingly present as the main denomination of graduate study programs. However, the concentration fields of these programs reveal a disciplinary matrix with three subfields, biodynamics, sociocultural and pedagogical, with the hegemony of the first.

Some North American scholars have pointed out difficulties in integrating and even including subdisciplines with sociocultural and pedagogical orientation within the epistemological framework on which kinesiology is grounded (VERTINSKY, 2009). In Brazil, a similar process occurs with a troublesome co-existence between socio-cultural and pedagogical subfields with biodynamics. This difficulty exposes the fact that most Brazilian scholars fell short of keeping in view the interests and needs of society and the role physical education may play in meeting them.

Jane Clark (2008) argued that kinesiology in the US has experienced an auspicious moment, and this is confirmed by the field's acceptance as eligible for evaluation by the U.S. National Research Council (THOMAS, CLARK, FELTZ, KRETCHMAR, MORROW, REEVE & WADE, 2007). However, there are some worrying similarities between kinesiology in the US and biodynamics, as a subfield of physical education, in Brazil. For instance, Thomas and Reeve (2006) reported that some North American departments are now engaged in replacing kinesiology with something like integrative physiology or integrative biology. Investigations privileging sociocultural and pedagogical matters have lost space in the academic field, be it called kinesiology or physical education. Vertinsky (2009) reported that in Canada many scholars of the pedagogical subfield have migrated to other areas such as education in search of having their work properly acknowledged and valued. Andrews (2008) also argued that although many departments still maintain sociocultural subdisciplines in their academic structure, the faculty staff is dominated by those working in biologically oriented subdisciplines.

Vertinsky (2009) called attention to the fact that the growing presence of kinesiology has implied a movement in the direction of privileging quantitative research with an

emphasis on natural phenomena and the search for identifying their underlying mechanisms. In contrast, preoccupations with social phenomena, qualitative research methods and interpretative studies were put aside. What Vertinsky pointed out is not new. More than a decade ago, Bain (1995) had already called for the field to start considering other forms of knowledge and knowledge production.

In Brazil, faculty members interested in socio-cultural and pedagogical matters lost space in the graduate study programs. These faculty members' scientific production is despised, and they face constant pressure in their daily lives ranging from central university offices to scientific agencies that privilege and invest in research based on a model of science that constantly overlooks the diversity and singularity of the nature of the faculty's research objects. An abyss is growing between university priorities and the dilemmas facing a society in need of adequate and responsible information, knowledge and intervention. The conduction of a gradual process of exclusion that faculty members in the sociocultural and pedagogical subfields have been submitted to have as one of the great villains the evaluation process of the graduate study programs being carried out in Brazil for the last fifteen years (BETTI, CARVALHO, DAÓLIO & PIRES, 2004).

A similar process is set to occur in North America. For instance, the evaluation criteria developed by a committee appointed by the American Alliance of Kinesiology and Physical Education (THOMAS & REEVE, 2006; THOMAS et al., 2007) established that a paper in a journal would be valued 15% to 20% more than a book. This shows how books are undervalued by committees involved in assessing academic productivity in spite of being one of the main ways to present the knowledge produced by sociocultural and pedagogical subfields. Vertinsky (2009) reported her own experience in producing books in Canada: books and chapters were valued 20%, 30%, even 40% less than the production of an article. The undervaluation of books led her to change the kind of research and method she usually did in order to have quantitative results that would be suitable for being published in papers. To meet the assessment's criterion, she had to sacrifice her intellectual expertise.

Tinning (2008), pondering the meaning of pedagogy, argued that although the origins of physical education are linked to pedagogy as a field of investigation only recently have pedagogical subfields or sub-disciplines marked their presence in university departments though with conceptual vagueness and ambiguities. In Brazil, the pedagogical subfield is the smallest in the graduate study programs. As far as knowledge production is concerned, shrinking pedagogical subfields contribute to the growing distance between what is investigated in the universities and the interests and needs of society.

Obviously, knowledge produced by kinesiology in general and in biodynamics in particular has great potential for generalization, but the applications for solving practical problems and the development of goods and services related to physical education require an investment in research oriented to dilemmas that populations are facing. Pedagogical studies are designed to face these challenges. Constraining this production based on a scientific policy that was justified itself by criteria that value quantitative productivity to the detriment of the impact and social relevance of scientific production also implies abdicating research that gives academic and professional legitimacy to physical education. Rink (2007) pointed out that this policy is reflected in the professional preparation where there is an unbalance between pedagogical disciplines and the disciplines dedicated to the understanding of the mechanisms of human movement. Undergraduate students in Brazil and in the US know more and more about the molecular basis of muscle contraction and less and less about how to plan a curriculum and how to conduct a classroom. This unbalance reflects the

investment that is done on biodynamic research and the prejudice to pedagogical research.

What is the path to follow from here? Andrews (2008) and Vertinsky (2009) agreed that kinesiology could benefit by being more inclusive of the sociocultural subfield. Andrews proposed forming an area called cultural physical studies as a way to aggregate many scholars whose research is oriented by human and social sciences. This area would consist of a synthesis of empirical, theoretical and methodological influences of various isolated sub-disciplines (among them would be sociology and the history of sport and physical activity). Vertinsky (2009) presented the idea that the sociocultural subfield could bring the necessary elements for constituting a field that would be truly interdisciplinary. Kinesiology, in spite of being interdisciplinary in conception, consists in fact of a set of isolated disciplines.

In Rink's perspective, there must be an effort to transform the present undergraduate education by orienting it toward those who choose to act professionally with physical education in and out of schools. Rink (2007) thought that one way to close the gap between pedagogical studies and kinesiology is a compromise between scholars in both subfields. Those in kinesiology should make an effort to engage in research focusing on issues stemming from practice. This might yield basic knowledge that holds more interest for the future professional. At the same time, researchers in the pedagogical subfield should be involved in identifying what basic knowledge of human movement is most relevant for dealing with practical problems.

The papers by Andrews (2008) and Vertinsky (2009) and the data surveyed on Brazilian graduate study programs show that the hegemony of biodynamics is not an isolated fact. This is in close relation to a worldwide trend in which universities are attracted to the so-called techno-sciences (ARAÚJO, 1998), sciences in the service of economic and political interests that retreat from a compromise with universal values such as justice, equality, freedom of expression and truth (SAID, 2005). As pointed out by Vertinsky (2009), in the battle between the subfields, we found the echo of the polarization between natural sciences and humanities described by Snow (1995) more than 40 years ago. Vertinsky suggested that there is ground for an approximation between the two, and she cited Gould's proposal on this matter (GOULD, 2003). Gould (2003) spoke of a conciliation in which the differences between natural sciences and humanities are for the benefit of all and not supposed to be eliminated. Gould (2003) argued that, no matter what we do, science follows a different path from humanities and vice versa and this difference makes them important for each other. In spite of Vertinsky's (2009) hopes, we are pessimistic about this conciliation on Gould's terms. The logic of kinesiology is better described by another approximation proposal: Edward O. Wilson's consilience. His argument is in favor of attaining the unity of science and knowledge (WILSON, 1998); however, such unity would be operated from a paradigm of the natural sciences, which implies the reduction of humanities to science.

Tinning (2008) proposed a review of sub-disciplines following the principles of a critical pedagogy as a means of questioning the modes of knowledge (re)production in each of them. This would be a way of restructuring subdisciplines and creating a common ground between them. Tinning's proposal is bold, and its implementation would imply a review and a critique of the very model of science that underlies kinesiology.

In spite of the need to approximate knowledge and practices pointed out by Snow (1995) and Gould (2003), the actual problem in kinesiology/physical education goes beyond a conciliation (or lack of it) between subfields and sub-disciplines. This effort of closing the gap and promoting a pacific co-existence between them touches on different questions, above all those of

a power struggle within university walls. The hegemony of certain groups imply the following: (a) control over the criteria to concede research grants, (b) obtaining larger portions of the research grants and (c) control over the admission of personnel to compose faculty. All this will serve to keep the status quo of those in power within the departments and universities. What we are living is a reproduction of a process that goes beyond the university walls. The university each day and with great speed is transforming itself into an institution compromised and redefined according to the logic and the laws of the market, with efficacious organization and a productivity resembling factories' assembly lines (LEOPOLDO e SILVA, 2006). This is being achieved at the expense of public resources and against the university compromise with decent and responsible teaching.

List of Brazilian universities with graduate study programs in Physical Education

UNIVERSO: Universidade Salgado Filho; RJ
UNESP/RC: Universidade Estadual Paulista "Julio de Mesquita Filho", Campus Rio Claro; SP
UFMG: Universidade Federal de Minas Gerais; MG
UFRGS: Universidade Federal do Rio Grande do Sul; RS
UFRJ: Universidade Federal do Rio de Janeiro; RJ
UDESC: Universidade Estadual do Estado de Santa Catarina; SC
UNICSUL: Universidade Cruzeiro do Sul; SP
UnB: Universidade de Brasília; DFl
UCB: Universidade Católica de Brasília; DF
UFES: Universidade Federal do Espírito Santo; ES
UFV/UFJF: Universidade Federal de Viçosa; MG
UFPR: Universidade Federal do Paraná; PR
UGF: Universidade Gama Filho; RJ
UFPEL: Universidade Federal de Pelotas; RS
UFSC: Universidade Federal de Santa Catarina; SC
USP: Universidade de São Paulo; SP
UNICAMP: Universidade Estadual de Campinas; SP
UNIMEP: Universidade Metodista de Piracicaba; SP
USJT: Universidade São Judas Tadeu; SP
FESP/UPE: Fundação do Estado de Pernambuco/Universidade de Pernambuco; PE
UEL/UEM: Universidade Estadual de Londrina; PR

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