

A JOURNAL IN MOVEMENT: CONTRIBUTIONS TO THE SOCIOCULTURAL AND PEDAGOGICAL SUBAREA OF BRAZILIAN PHYSICAL EDUCATION (2004-2014)

*UMA REVISTA EM MOVIMENTO: CONTRIBUIÇÕES PARA A SUBÁREA
SOCIOCULTURAL E PEDAGÓGICA DA EDUCAÇÃO FÍSICA BRASILEIRA (2004-
2014)*

*UNA REVISTA EN MOVIMIENTO: CONTRIBUCIONES PARA LA SUBAREA
SOCIOCULTURAL Y PEDAGOGICA DE LA EDUCACIÓN FÍSICA BRASILEÑA
(2004-2014)*

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Keywords:

Periodicals.
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indicators.

Abstract: This paper shows the contribution of journal Movimento to the socio-cultural and pedagogical subfield of Brazilian Physical Education between 2004 and 2014. As a quantitative and qualitative work, it uses Scientometric and Bibliometric techniques to analyze the following indicators: frequency; link with post-graduate studies; funding; type of authorship; academic education; relationship with research groups; and institutional affiliation. The results show increase in collective works as a trend in the PE scientific field; Movimento's performance in publishing studies produced in Brazil and abroad; and the need for policies that strengthen studies developed in the "periphery" of the National System of Post Graduation.

Palavras chave:

Publicações
periódicas.
Atividades científicas
e tecnológicas.
Educação de
pós-graduação.
Indicadores
bibliométricos.
Educação.

Resumo: Demonstra a contribuição da revista Movimento para a subárea sociocultural e pedagógica da Educação Física brasileira entre 2004 e 2014. De natureza quanti-qualitativa, faz uso de técnicas da Cienciometria e Bibliometria para analisar os seguintes indicadores: periodicidade; vínculo com a pós-graduação; presença de financiamento; tipo de autoria; formação acadêmica; relação com grupos de pesquisa; e vínculo institucional. Os resultados evidenciam: o crescimento de trabalhos coletivos como tendência no campo científico da área; a atuação da revista Movimento, que veicula pesquisas produzidas no país e internacionalmente; e a necessidade de políticas que potencializem os estudos desenvolvidos na "periferia" do Sistema Nacional de pós-graduação.

Palabras clave:

Publicaciones
periódicas.
Actividades
científicas y
tecnológicas.
Educación
de posgrado.
Indicadores
bibliométricos.

Resumen: Demuestra la contribución de la revista Movimento para la subárea sociocultural y pedagógica de la Educación Física brasileña, entre 2004 y 2014. De naturaleza cuanti-cualitativa, utiliza técnicas de la Cienciometría y Bibliometría para analizar los siguientes indicadores: periodicidad, vínculo con el posgrado, presencia de financiación, tipo de autoría, formación académica, relación con grupos de investigación y vínculo institucional. Los resultados muestran: el crecimiento de trabajos colectivos como tendencia en el campo científico del área, la actuación de la revista Movimento que vehicula investigaciones producidas en el país e internacionalmente y la necesidad de políticas que potencialicen los estudios desarrollados en la "periferia" del Sistema Nacional de Posgrado.

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1 INTRODUCTION

In Brazil's current science and technology scenario, the National Graduate Studies System (*Sistema Nacional de Pós-Graduação*, SNPG), despite its problems,¹ has proved to be a good public policy for promotion and qualitative development of scientific research, and for building a critical mass. In the last two decades, according to Veloso *et al.* (2003), Doutores (2010) and Nascimento (2010), graduate studies grew in Brazil, causing the country to gain prominence in Latin America's science scenario.²

As an exciting challenge within that system, scientific communication works as a device to develop the graduate studies sector since it is an important means for transferring and sharing technical and scientific information. According to Meadows (1999), communication is as vital for science as for research itself; and in Brazil, for the SNPG as well.

At the forefront of that structure is what Job and Freitas (2010) called informal channels (oral presentations and conferences) and formal channels (those classically established by scientific books and journals), which are "strategic places" (CERTEAU, 1994) for the circulation of consonant and dissonant voices in the field. Therefore, the more renowned a journal is, the more value it adds to the articles it publishes, while the process also contributes to valuing that communication channel itself.

In the field of Physical Education, especially in its sociocultural and educational area, disputes over better spaces for publication have become an important challenge for researchers involved with graduate studies, mainly due to the lack of upper strata journals in Portuguese that receive works on the humanities. This scenario can be seen especially in the current situation of the field, in which *Movimento* has the highest national rating – stratum A2 in the *Webqualis* system.

This challenge pointed out by Job (2015) becomes even stronger because of the need for survival of Physical Education graduate programs which, in most cases, require submitting/publishing articles in journals rated A1-B5 in WebQualis to obtain a master's degree and A1-B1 for a PhD (SILVA; GONÇALVES-SILVA; MOREIRA, 2014).

Movimento has played an important role in the sociocultural and educational area because it publishes only research on topics linked to the Social and Human Sciences, specifically in its pedagogical, historical, political and cultural aspects, which favors the development of graduate programs and/or research lines related to the humanities.

Another relevant issue is monitoring scientific activity, its impact and results. For that, quantitative and qualitative evaluation methods have been developed that allow assessing the levels of development achieved by a knowledge area, namely: researchers' productivity rates; potential for growth of institutions and courses; and priorities for resource allocation.

The field of research focused on such studies is known as "statistical bibliography" or bibliometrics. It is the application of statistical and mathematical techniques to describe aspects of literature and other media (VANTI, 2002). Bibliometric analysis is a basic tool to study scientific communication phenomena, and it gains significance when it resorts to a useful method to measure the impact of certain authors or journals among the scientific community. This type of investigation has been established as one of the ways to evaluate scientific production in different knowledge areas (CARDOSO *et al.*, 2005).

¹ As academic productivism pointed out by Sguissardi and Silva Júnior (2009).

² That is a paradox, as pointed out by Lovisolo (1997) when he compared models for scientific communities in Brazil and Argentina.

The process of building and developing the indexes³ for evaluating academic production, its use and its consequences has been debated since the 1950s and have been improving as it develops (CURTI *et al.*, 2001; GARFIELD, 1955, 1999; MEHO, 2007). Since then, articles have been published with the purpose of better understanding the evaluation of the production of different knowledge areas and therefore understanding the extent and nature of research activities carried out in several countries and institutions. Given the problems presented, our purpose is to show *Movimento's* contribution to the sociocultural and pedagogical subfield of Brazilian Physical Education between 2004 and 2014 and to identify the features of the scientific community that publish their research in that journal.

2 METHODOLOGY

This is a quantitative and qualitative study that used techniques aimed at scientometric and bibliometric analysis. Scientometrics⁴ includes the study of sciences in order to understand their structure, evolution and connections. It is based on bibliometric indicators built from documents published in specialized channels and used as indirect measures of scientific research activity. Those indicators contribute to understand research objectives, the structures of the scientific community, and its social, political and economic impact.

The analysis of scientific production has a significant set of bibliometric indicators, including: production indicators and connection indicators. *Scientific production indicators* are built by counting publications according to type of document (books, articles, scientific publications, reports, etc.), institution, area of expertise, country etc. *Connection indicators*, in turn, are built according to co-occurrence of authorship, citations and words. They are applied in the preparation of maps of knowledge structures and relationship networks between researchers, institutions and countries (SANTOS; KOBASHI, 2005).

These indicators contribute to understand the structure of the scientific community, the particular goal of the research or its social, political and economic impact. However, they do not represent the “truth” about the state of science and technology; rather, they are approximations to or an incomplete expression of reality (SANTOS; KOBASHI, 2005).

Being computed with due methodological rigor and interpreted based on each area of knowledge's specifics and bibliographic production practices, bibliometric indicators are useful and important for understanding the cycle of creation, reproduction and dissemination of science, and also for improving the country's science and technology policy (MUGNAINI; JANUZZI; QUONIAM, 2004).

Given the above, data were collected by consulting electronic editions available on *Movimento's* website. A database was created with the following bibliometric indicators: number of articles published in each edition; type of authorship (individual or collective); distribution of authors per article; authors' titles; institutional affiliation and area of work in graduate studies (where it exists); relationship with research groups; and funding.

³ As shown by Meho (2007), *h-index*, *a-index* and *g-index*.

⁴ Vanti (2002, p. 153) states that the term originated in the former USSR and Western Europe, and was used mainly in Hungary. Originally, as the author points out, it referred to the application of quantitative methods to study history of science and technological progress. His first definitions considered it as “[...] measurement of the information process, where ‘information’ meant the discipline of knowledge that studies the structure and properties of scientific information and the laws of the communication process”. The term gained notoriety in 1977 when the journal *Scientometrics* started to be published, initially in Hungary; it raised academic interest in the 1980s when the Institute for Scientific Information (ISI) sold its database to different institutions as an auxiliary tool in the development of scientific policies.

Collection was based on the information provided by authors in their texts. However, when data were not available in publications, searches were extended to information provided in the Lattes Curricula of researchers signing the articles, where we checked information about research groups⁵ and their institutional ties and/or their orientation regarding *stricto sensu* (regular length) post-graduate studies at the time of publication. This procedure was implemented in order to provide more reliable data on the relationship with the area and link to a graduate program.

Data were categorized in order to present the organizational overview of the academic community that circulated through *Movimento* in 2004-2014. Analyzes and tabulations were performed through charts and Microsoft Excel tables so that each category produced a systematic view of the information gathered in the data collection instrument. Whenever possible, trendlines were drawn with R^2 ratio closest to 1.⁶

The process enhanced the analysis of sources as well as the dialogue with specific literature. The data helped to understand the different characteristics of the area to which Physical Education is linked – Area 21 – and its regulations, thus allowing us to identify the direction taken by scientific production published in *Movimento* and the nature of the journal itself.

3 FREQUENCY

A journal's frequency of publication is an important indicator of its quality as a scientific communication medium, since it shows the seriousness and commitment of the editorial team involved in its management process.

As shown in Chart 1, in 2004-2014, *Movimento* published its editions regularly, in accordance with the journal's stratum in a three-year period,⁷ according to the *Qualis* Capes evaluation system, which finds resistance in its rating formula in areas of knowledge with distinct characteristics.⁸

Chart 1 – Frequency of publication for *Movimento* 2004-2014



Source: Authors

Between 2004 and 2008, *Movimento* published three quarterly editions per year, which was consistent with the journal's *Qualis*⁹ rating for the period. In the system adopted by Capes

5 Information about research groups were also confirmed on the website of the CNPq groups directory.

6 The closeness of the R^2 ratio to 1 indicates the degree of adjustment of the trendline type to the data presented in graphical representations.

7 The regular Capes evaluation has recently become quarterly.

8 As can be seen in Pereira (2009), Garcia (2009) and Caramelli (2010). Whether they are positive or negative, criticism generated by debates is always productive, controversial and sensitive.

9 At the time, Capes's evaluation system included rating strata for scientific journals, which could be rated according to criteria for scientific indexing and organization between levels A, B and C in the National category; and A, B and C in the international category.

between 2003 and 2006, the journal was rated as “B national”, causing high dissatisfaction in its editorial board at the time. According to the Editorial (2005), that rating was unacceptable because of the journal’s performance in 2001-2003 and 2004-2006, which was equivalent to the “C International” level.

The journal’s editors have always been clear about their effort to improve it and their quest for equalization in the process of evaluation and classification of the journals in the sociocultural and pedagogical subarea in relation to those that focus on research of the biodynamics subarea. During that period, dissatisfaction was such that an Editorial (2006) questioned the seriousness and impartiality of evaluation criteria and evaluators.

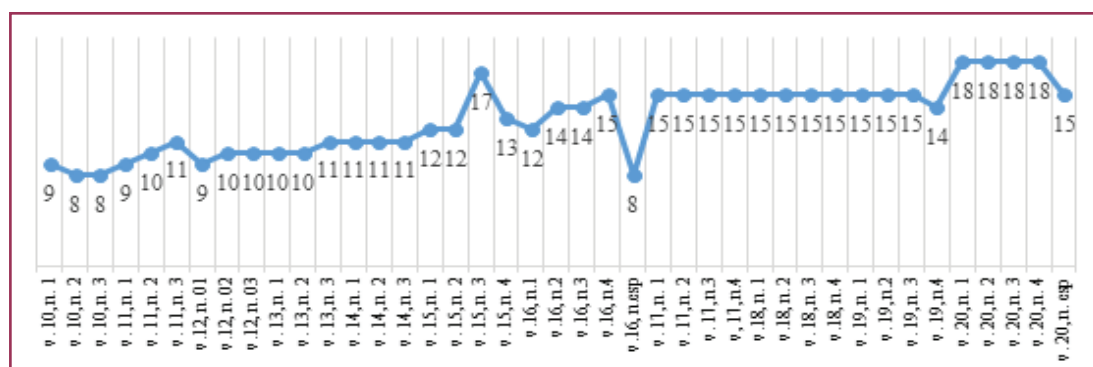
After Capes’s evaluation system changed in 2007-2009, *Movimento* entered stratum B2¹⁰ in Area 21 scientific journals, giving it a status of secondary journal in the *Qualis* system, which always bothered its editors.

Perhaps because of that, in the first edition of 2007 there was significant change in the behavior of the journal’s editors who adopted, although “unwillingly”, the “[...] arbitrariness of so-called ‘prestige indexers’” (EDITORIAL, 2007), understanding the relevance of that measure for the journal to improve its rating and for the survival of researchers in graduate studies.

Migrating to the platform known as Electronic System for Journal Publishing (*Sistema Eletrônico de Editoração de Revistas*, SEER) enabled *Movimento* to reach new levels of quality and improve publication regularity and punctuality. That also enabled it to become a quarterly publication in 2009, when it started to publish four editions per year. These measures made the journal more reliable, which contributed for it to receive investment towards *Qualis* A2 in Area 21.

Two special editions were published in 2010-2014: a commemorative edition about the 70th anniversary of the Physical Education School of the Federal University of Rio Grande do Sul (Esef/UFRGS) and another one related to *Movimento*’s 20th anniversary. Those publications increased the amount of editions per year from four to five in those two years. The special editions also resulted in an increase in the volume of articles published in 2004-2014, causing the regularity line for the number of articles to oscillate in editions 16 and 20 as seen in Chart 2.

Chart 2 – Evolution in the number of articles published per editions of journal *Movimento* (2004-2014)



Source: Authors

Chart 2 shows that 531 articles were published in the 38 editions of *Movimento*, in an average of 13.97 articles per edition. That indicates that the journal’s performance was above the minimum required by CNPq for a scientific journal funded by that agency, i. e. five articles

¹⁰ The system started to be divided as a regressive rating, in *Qualis* A1, A2 and B1 (considered upper strata); B2, B3, B4 and B5; finally, the C stratum (inadequate scientific journal).

per edition.¹¹ The average growth in number of articles per edition was boosted by an increase in ad hoc reviewers, which streamlined the peer review process. The period also coincided with the journal becoming digital, which has lowered production costs of scientific journalism¹² and facilitated the circulation of a higher number of manuscripts.

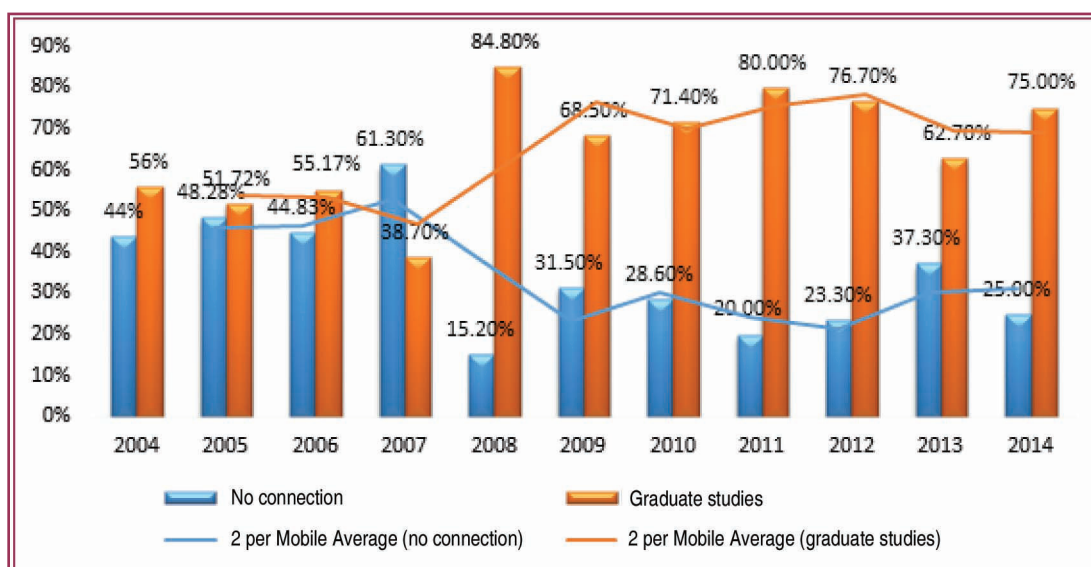
4 GRADUATE STUDIES

In Brazil, research with higher quality and impact tends to come from the SNPG, since resources from development agencies are primarily intended for graduate programs as grants, scholarships and several types of loans.

Based on this assumption, Chart 3 shows the relationship of studies published by *Movimento* with Brazilian graduate studies in 2004-2014. The chart shows a trendline indicating average fluctuations of the indicators analyzed, as an overview of the contribution of graduate studies to the journal and, consequently, by the journal to SNPG.

The curves formed by peaks and valleys of the line shed light on the trend in science in the sociocultural and pedagogical subarea of Physical Education, highlighting the movements of the scientific field that can be identified through analysis of 531 articles published by *Movimento* during the period analyzed.

Chart 3 - Articles published by *Movimento* with and without connection with so-called strict sensu (regular length) graduate studies in 2004-2014



Source: Authors

Data in Chart 3 shows two situations regarding the relationship between articles published by *Movimento* and SNPG. Between 2004 and 2007, the percentage of articles related to graduate programs was close to those that did not indicate this relationship. Until 2007, there was a slight tendency of increase in the number of texts with no connection with the system of stricto sensu post-graduate studies, whose number was higher than that of works with clear relations to master's and doctoral programs.

¹¹ As described in the norms of CNPq's Editing Grant (*Auxílio Editoração*), which can be seen in http://www.cnpq.br/view/-/journal_content/56_INSTANCE_0oED/10157/25480.

¹² See King and Tenopir (1998).

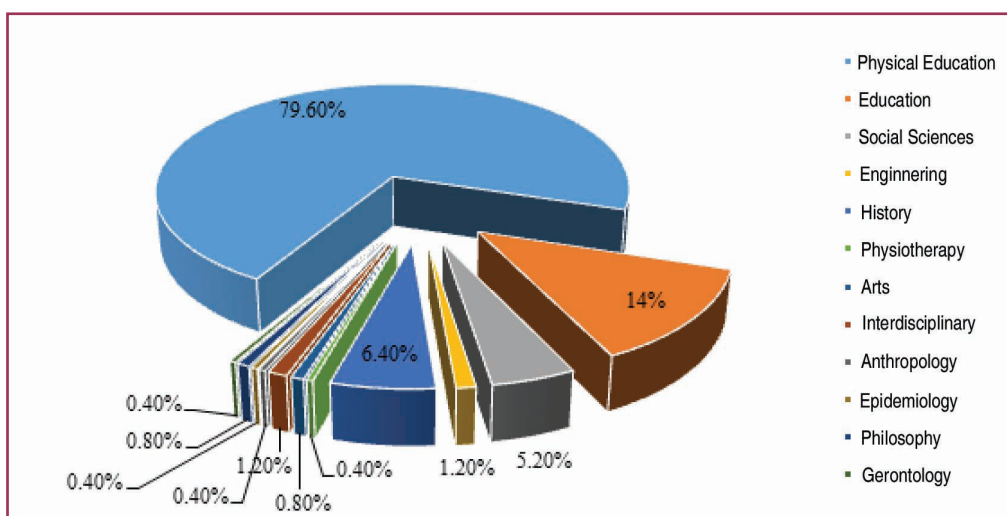
Thus, if we consider that graduate programs add quality to scientific production, we can point out three possible situations: a) until 2007, a high percentage of higher quality research was out of the graduate circuit; b) the journal was not a massive channel for the flow of scientific production in Area 21, so that it had no relevant performance for the development of science under the model adopted in Brazil; and c) editors' criticism to *Movimento's* evaluation by Capes did not find support in that quality indicator.

With the journal's subjection to the "arbitrary models" related to the journals' prestige indicators as announced in Editorial (2007), data in Chart 3 point to a rapid change in the quality indicator. The average trendline for articles coming from graduate programs rose abruptly, reaching a peak in 2008 when 84.80% of them were connected to the SNPG, and maintaining an average trend of 70% of articles coming from master's and doctorate programs.

The data indicate that, while it was questionable from the political and ideological point of view, assuming quality criteria of relevant indexes was a correct decision by *Movimento*, since it became an important channel for scientific research in the sociocultural and pedagogical subarea present in Area 21.¹³

To illustrate the distribution of knowledge areas for articles published by *Movimento*, Chart 4 was based only on articles related to graduate programs. Therefore, the following chart was based on 250 articles with those characteristics.

Chart 4 – Knowledge area of articles published by *Movimento*, 2004-2014



Source: authors

Chart 4 indicates that *Movimento* has received articles from distinct sources, written by authors from graduate programs from eleven different scientific fields. The participation by Physical Education programs is clear, with 79.60% of publications. Such quantitative representation was to be expected since *Movimento* is based at Esef/UFRGS, indicating the journal's strategic importance to maintain those programs.

Because of *Movimento's* sociocultural and pedagogical characteristics, it features a remarkable presence of research originating in areas close to Physical Education – 20.40% of the articles were produced in graduate programs such as Education, Social Sciences and History. As shown by Corte (2009) and Carneiro, Ferreira Neto and Santos (2015), those

¹³ This has already been pointed out by Schneider *et al.* (2009) and opposed by Stigger *et al.* (2010). The data lead us to reiterate the view that the journal needs to seek strategies for improvement while maintaining its identity.

knowledge areas contributed to the epistemological basis of the sociocultural and educational area of Physical Education, and professionals with that background often seek those programs for their master's and PhD level education.¹⁴ Thus, it is expected that they will seek to publish their work in an established journal in their original area.¹⁵

Chart 4 shows a process of consolidation of graduate studies in the area because, since, as mapped by Nascimento (2010), by the end of the 1990s there were few graduate studies programs in Physical Education, and the search for training in related scientific fields was common, especially in the area of Education. In these terms, the predominance in *Movimento* of research produced by authors linked to master's and doctoral programs in the area of Physical Education, whether as students in training or as graduate professors, indicates an increased access to specific training in sociocultural and educational areas in Physical Education, which may represent more resources from development agencies for the scientific development of the field.

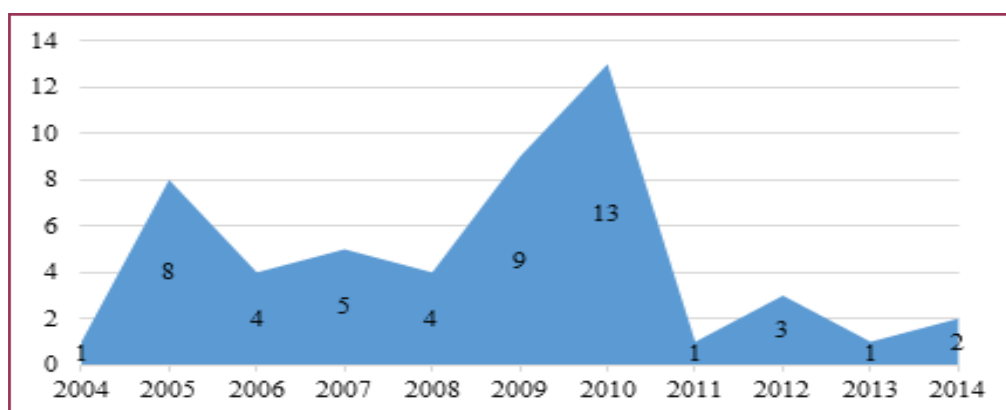
5 RESEARCH FUNDING

Raising and allocating funds for research is always controversial in all areas of scientific knowledge. Disparity in the distribution of resources is one of the most debated topics in Brazilian science (YAMAMOTO, 2000), which causes authors publishing in journals at higher WebQualis strata to be always struggling for funds that may allow improving their scientific practices.

Funding agencies often require the inclusion of their names in works originated from research produced with their funds, as a counterpart contribution. Thus, the presence of funded studies in the pages of a journal is a strong indicator of quality.

Chart 5 shows the evolution in the number of funded studies published by *Movimento* between 2004 and 2014. Data show that 9.6% (51) of articles received financial support from funding agencies, which can be seen as very low, considering the importance of the journal for the area of Physical Education.

Chart 5 – Number of funded studies published by *Movimento* between 2004 and 2014



Source: Authors

Chart 5 shows high irregularity in the number of funded studies published by *Movimento*, indicating two high peaks and a sharp drop. This situation shows that the positive impact of management changes adopted by the journal in 2007 did not resonate in the volume of research with financial support from

¹⁴ According to the data provided by Nascimento (2010), by 2003 there were only eight stricto sensu graduate programs in public institutions in Brazil: four in federal universities and four in state universities.

¹⁵ This movement becomes even more relevant to the authors linked to graduate programs in education as *Movimento* is also classified as A2 in that area. Thus, they increase productivity in the course and make circular production in the area of Physical Education.

funding agencies. Three hypotheses were raised to explain that situation: a) funded research is submitted to foreign journals with higher impact factor; b) resources allocated to research in the sociocultural and pedagogical area of Physical Education are not evenly distributed in graduate programs; and c) a high percentage of authors do not inform the agencies that supported their research.

In order to test the hypotheses, we randomly selected ten authors who held master's degrees or were PhD candidates at the time of publication, because of the regularity of grants available to researchers at those levels. We sought indications to check hypotheses in those authors' Lattes Curricula.

None of the curricula of the authors in the sample included articles published in foreign journals. While reviewing their curricula, we found that nine authors received research grants to write their theses or dissertations, indicating that information on funding sources has been concealed, even with *Movimento's* guidelines to include funding agencies in metadata.

It is true that funding is always a sensitive issue. In current times, it becomes even more complex because of government measures to curb expenses. Such policy has led graduate programs to receive fewer resources in their main revenue item – the budget of CAPES' Program to Support Graduate Studies (Proap), causing dissatisfaction in area coordinators, who wrote a letter-manifesto against fund cuts.

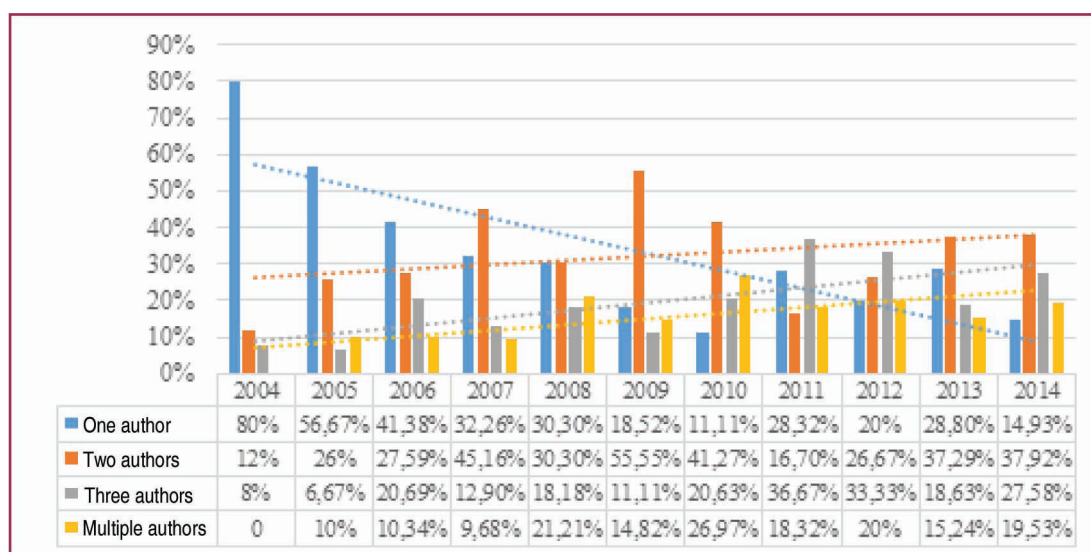
However, the “problem” of research published by *Movimento* probably does not include funding, but rather researchers' “forgetting” to mention agencies from which they receive funds for their studies.

6 AUTHORSHIP

Based on the 1305 author signatures – including undergraduate students and postdoctoral researchers who published 531 articles in *Movimento*, there are four ways for research to circulate: articles published by one, two, three or multiple authors (four or more).

Chart 6 shows the evolution of author number in articles published by *Movimento* in 2004-2014, pointing out oscillations in ways to convey research in the scientific community. The chart provides a glimpse of a tendency to be followed in the scientific field regarding ways of practicing science in the sociocultural and educational area of Physical Education.

Chart 6 – Author make-up of articles published in the *Movimento*, 2004-2014



Source: Authors

Chart 6 indicates a trend change in the way to publish research in *Movimento*. A gradual change can be seen in the behavior of the scientific community, which has been organizing increasingly often in groups of authors, mostly in pairs and trios. The publication of CAPES's decree 51 in June 2004 underscore this argument, since the document was prepared in order to establish "[...] standards and procedures for annual evaluation of proposals for master's and doctorate courses and define the design of the application to be used to submit those proposals" (BRASIL, 2004, p. 1).

One criterion presented in that document for implementing graduate programs and evaluating existing courses is the existence of professors with quality scientific production in the field, to ensure the course's regularity. According to the same document, such processes should be encouraged by the organization and after maturation of research groups able to feed focus areas.

The predominant authorship profile found in the journal is still the classic form of publication in the areas of humanities (GOLDIM, 2007), which typically include a student, an advisor and a possible co-advisor. However, Chart 6 shows a change of perspective in the *modus operandi* of this academic community, indicating that if that trend is sustained, the sociocultural and educational area will very soon assume the same scientific practices adopted in the so-called "hard sciences" in respect to author makeup.¹⁶

These ways can be interesting for the development of the field, but they must be addressed with caution, particularly regarding justifications for authors' participation, so that some unwanted practices can be prevented. On the number of researchers signing the same work, Meadows (1999) argues that, in scientific communication, the authors of a study should be mentioned according to the relevance of each researcher's contribution to it, but he considers that in articles in which several authors cooperate in various aspects of the research, it is difficult to determine the relative importance of their contributions.

Thus, considering that some of the journal's articles were signed by ten or more authors,¹⁷ we might say that it is impossible to justify the effective participation of all researchers. However, it should be noted that this research practice is a trend in scientific articles, since CAPES's increasingly strong demand for publication causes researchers to use it more often.

Therefore, some unwanted practices may occur (or have occurred) in *Movimento's* articles, in a scenario that seems closer to what Coimbra Júnior (1998) calls "gift authorship". The term is related to the texts in which authors include researchers

[...] whose contribution to the study, even though it is quite marginal, gains status of co-authorship, giving them the same merit as that received by researchers who actually devised the work, obtained funding, conducted it and wrote the article (COIMBRA JÚNIOR, 1998, p. 1).

According to Coimbra Júnior (1998), this practice includes strong reciprocity, so that authorship given as a gift becomes a bargaining chip for future reward. Such network of "favors" can produce scientific careers with very high productivity, even if they are not based on effective development of original research.

Further possibilities for explaining what happened resonate in the research of Monteiro *et al.* (2004). By studying the issue of authorship in the medical field, they ponder some unethical

¹⁶ Also pointed out by Lazaroni Filho *et al.* (2012).

¹⁷ It is important to note that the fact that these articles have many authors does not mean that those researchers use methods of "gift authorship" (COIMBRA JÚNIOR, 1998) and "guest authorship" or "under pressure" authorship (MONTEIRO *et al.* 2004).

deviations and practices that often occur when establishing authorship of scientific publications. Those practices are identified as: “guest authorship”, where the name of an author is included for distinct reasons – either because of his or her prestige or to serve as a “bargaining chip” in the future; “under pressure authorship”, where group heads require the inclusion of their names in all works of their teams, even though they might not even have read them.

In scientific research, those practices have important implications, for example, for funding and academic promotions. Moreover, they elude “[...] one of the basic principles of science, which is transparency, thus compromising the whole credibility of the research” (MONTEIRO *et al.*, 2004, p. 4). The topic is undoubtedly controversial, so this collaborative effect is interpreted as a kind of corporate solidarity for maintenance and growth of research groups and graduate programs. Its goals are announced and necessary for the possible expansion and improvement of professional training in Physical Education. Therefore, multi-author articles are seen as important especially when associated with research groups and coordinated with researcher training projects at different levels of science’s production chain.

To test author structures, we calculated the Collaboration Index for sociability networks formed by authors who published in *Movimento*. According to Spinak (1996), that index can be calculated by adding the number of authors per article (*i*) to the number of articles with *i* authors (*N_i*), divided by the total number of articles (*N*), as shown in the following formula:

Collaboration Index (CI)

$$CI = \sum i.N_i/N$$

Where:

N = total articles

i = number of authors in the article

N_i = number of articles with *i* authors

CI = Weighted average number of authors per article

Table 1 – Relationship between author structure and the number of articles published by Movimento, 2004-2014

Type of authorship (<i>i</i>)	Number of articles by type of authorship (<i>N_i</i>)	(<i>i</i>).(<i>N_i</i>)
1	145	145
2	180	360
3	116	348
4	43	172
5	30	150
6	7	42
7	2	14
8	2	16
9	3	27
10	2	20
11	1	11
TOTAL (<i>N</i>)	531	

Source: Authors

Table 1 shows the relationship between the number of articles published by Movimento and the type of author structure of those works. Based on these data, we obtained the following equation:

$$CI = 1,145 + 2,180 + 3,116 + 4.43 + 5.30 + 6.7 + 7.2 + 8.2 + 9.3 + 10.2 + 11.1 / 531$$

$$CI = 2.46$$

The collaboration index among authors who published in *Movimento* points to joint work of 2.46. This means that each author work on average with more than two different researchers to circulate their production.

According to Lara and Lima (2009), some reasons lead to the search for increased collaboration, such as: changes in funding patterns and levels; researchers' desire to increase their popularity, visibility, and scientific recognition; gradual demand for rationalization of scientific power; need for instruments on a larger scale and complexity; gradual scientific specialization; advancement of the disciplines in which researchers need other researchers' knowledge; increasing professionalization of science; need to gain experience and train new researchers; desire to work across disciplines; need to work in close physical proximity with other researchers.

"[...] Negotiation and exchange of scientific collaboration also require socio-emotional investment in order to maintain collaborative relationships [...]" (LARA; LIMA, 2009, p. 218), as can be seen in Carneiro, Ferreira Neto and Santos (2015), when they consider the use of scientific conferences to establish academic networks and accumulate symbolic capital. However, by observing the universe of authors, we infer that the level of collaboration has not yet reached its full potential because, according to data in Chart 6, it should improve in the coming years as a result of the tendency to establish highly collaborative production in the field.

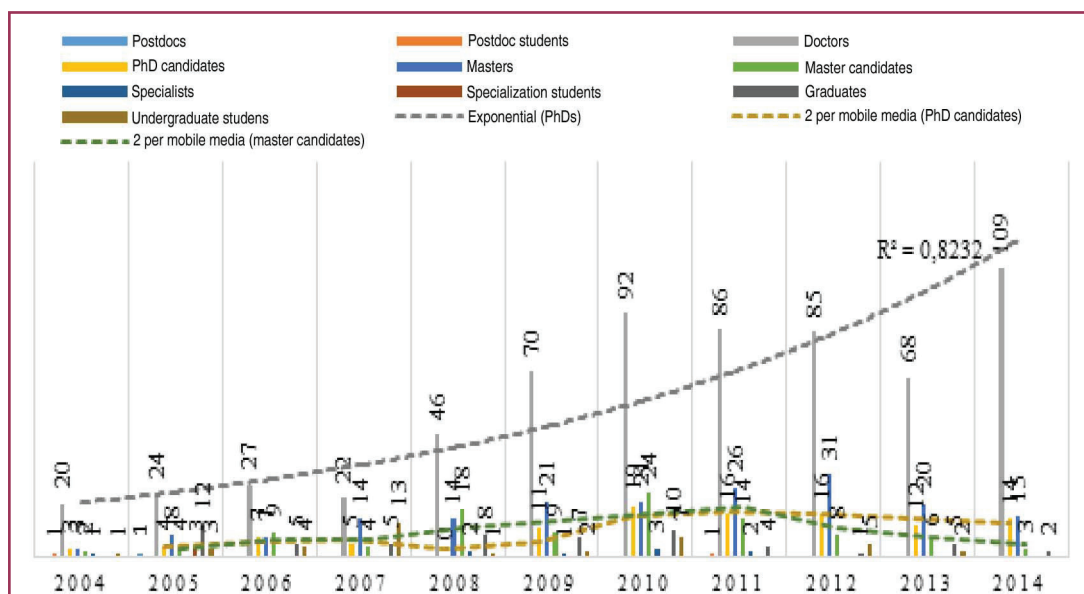
Regardless of the the reasons that led authors to expand their levels of joint production, the phenomenon should be closely watched by editors at *Movimento* and other journals in order to define the necessary steps to maintain the integrity of the works they publish as well as the ethical values desired for research practices in the scientific field of the sociocultural and educational area of Physical Education.

7 ACADEMIC BACKGROUND

Regarding academic background of the authors who were published by *Movimento* in 2004-2014, the data pointed to a high level of education in so-called *stricto sensu* post-graduate studies.

Chart 7 shows exponential growth in the number of PhD holders signing articles published by *Movimento* with respect to absolute numbers of authors, followed by almost irrelevant participation of so called *lato sensu* graduate (shorter) programs and graduates/students. This scenario can be explained by two interrelated factors.

The first factor is the increase in the number of articles published per edition of the journal. Thus, it is expected that more qualified researchers are able to publish more articles. The second factor is related to the improvement in the journal's evaluation at *Webqualis*, it has become the Brazilian scientific journal in the area of Physical Education with the best position in CAPES's ranking and a strategic place of publication for PhDs with ties to graduate programs.

Chart 7 – Titles of researchers who published in *Movimento* in 2004-2014

Source: Authors

These data are echoed in the demographic study published by the Center for Management and Strategic Studies (CGEE) on the development and distribution of Brazil's technical and scientific basis, showing a growing number of professionals with master and PhD level education.

Note also that PhD programs are relatively much less concentrated in geographic terms than graduates from those programs. [...]. Moreover, the fast growth in the number of PhD programs in regions with less tradition in postgraduate studies may be anticipating a trend towards more training of doctors in those regions as the recent programs consolidate (DOUTORES, 2010, p. 34-35).

This scenario indicates that in the area of Physical Education, as well as in Brazil's science and technology in general, investments in science policies, which started strongly in Brazil between the 1960s and 1970s, have been achieving the expected effect, since the national scientific-technical basis has been consolidating with the necessary level to support cutting-edge scientific research.

The presence of a critical mass formed by an extensive network of doctors is an important quality indicator for *Movimento* and highlights the increasing development of human resources in the scientific field of Physical Education. However, taking into account the increase in participation of graduate studies in the journal's publications, the low number of master's and PhD students signing those texts (less than 50%) is surprising, especially considering the journal's weight in CAPES's evaluation.

This scenario might be explained by the following elements: a) PhD holders linked to post-graduate programs have been publishing without the presence of students in more qualified journals, which would not be desired by Capes, since one of the evaluation criteria for the programs is joint publication between professors and students; b) on top of that, master's and PhD students would be publishing in lower-rank journals; and c) in a positive view, theses and dissertations circulate in higher-rank journals only after there have been defended.

By way of illustration, publications of ten professors and ten newly graduated doctors were randomly checked.¹⁸ Data indicated that 80% of articles written by masters were linked to research defended during their training, while 50% of doctors' publications are parts or summaries of their doctoral theses.

Hypothesis "c" gains strength with regard to masters' publications, given the high percentage of articles that are products of those dissertations. This feature can be emphasized because of the time allotted for the preparation of master's works.

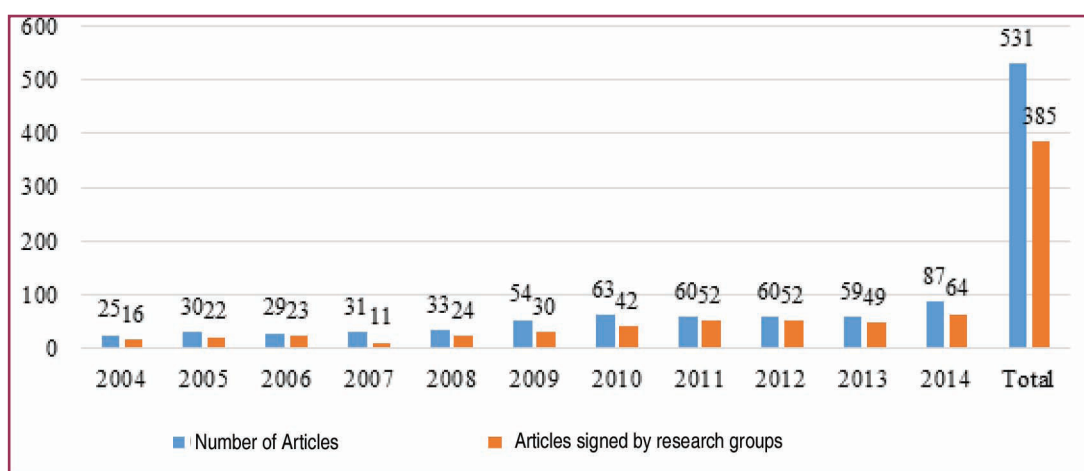
Data estimated for those have recently finished their PhDs denote a percentage balance on the relationship with the doctoral theses of those researchers, which may indicate their ties with research groups and, consequently, participation in other educational projects developed by others subjects at different stages within science's production chain.

8 RESEARCH GROUPS

Data from *Movimento* indicate that 410 different research groups contributed with publications to the journal during the period under scrutiny. Groups were identified based on information provided in the articles, authors' Lattes Curricula and on the website of CNPq's groups directory.

Chart 8 shows that 72.5% (385) of articles published by *Movimento* in 2004-2014 were signed by researchers with academic ties with research groups. This preliminary analysis already points to joint production between those researchers from different groups, since there were more research groups than the amount of texts produced and published by them.

Chart 8 – Evolution in the number of articles linked to research groups in *Movimento* in 2004-2014



Source: Authors

Data show increase in the number of articles associated with research groups. It is possible to infer that this increase is a result of CAPES's interventions because, according to Lovisolo (2003), Brazilian public policies have associated *stricto sensu* graduate studies directly to research, covering lines and terminologies developed by the agency, which, according to Mocelin (2009), increased the number of research groups in Brazil, especially from the 2000s on.

¹⁸ We considered works by authors who had defended them within three years of the publication of the articles, since that is the period in which CAPES scores researchers with regard to their institutional link.

CAPES also states that development of research groups must precede the creation of graduate programs. Because of that, according to Lovisolo (2003), there is a growing feeling that not being part of those groups and not being in the Lattes curriculum platform means academic marginalization. According to Mocelin (2009), non-participation, justified by Lovisolo (2003), entails restrictions to the possibilities of raising funds from agencies. That has contributed substantially to increase the number of research groups in the field of Physical Education.

Based on that premise, we conducted a survey of research groups with higher circulation of articles in *Movimento* in 2004-2014. To build this table, we selected groups that published at least one article per edition on average. As shown in Table 2, based on this filter, seven groups met the criteria.¹⁹

Table 2 – Research Groups with higher productivity in *Movimento* 2004-2014

GROUPS	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Cepels – UFPR	-	1	1	-	2	1	4	10	1	4	7	31
Núcleo de Estudos e Pesquisas Educação e Sociedade Contemporânea – UFSC	-	-	1	1	2	1	4	3	3	2	3	20
Proteoria – Ufes	1	1	-	-	1	3	2	4	3	2	3	20
Lesef – Ufes	1	-	2	1	1	1	3	2	2	2	1	16
Labec – UFRJ	-	-	-	-	-	-	1	1	3	2	7	14
Laboratório de História do Esporte e do Lazer SPORT – UFRJ	-	-	-	-	-	1		4	1	2	5	13
Gepecic – Unicamp	-	-	-	1	-	-	2	3	2	1	2	11

Source: Authors

According to CNPq's directory of groups, it is clear that institutionalized intellectual collectives that published in *Movimento* (Table 2) were those whose human resources included an important number of researchers with authority and accumulated experience in sociocultural and pedagogical research – the type of studies covered by the journal.

Taken together, the articles of those groups represent 23.5% (125) of works that circulated in the journal in the ten years analyzed. This indicates the formation of a critical mass specialized in discussions based on the Human and Social Sciences and pedagogical debates. These researcher groups are linked to graduate programs so that their research is connected to educational projects, which generates quality demand for production, pushing for circulation of such articles in scientific journals of higher impact.²⁰

It is clear that the performance of those groups provides an important contribution to the process of improvement of *Movimento* and to research in the sociocultural and pedagogical subfield. However, the maintenance/expansion of that scenario can generate epistemological inflexibility in that scientific production as it would circulate a significant amount of research grounded in theoretical frameworks and methodologies that are unique to those groups of researchers, which can become what Bachelard (1996) called epistemological obstacles.

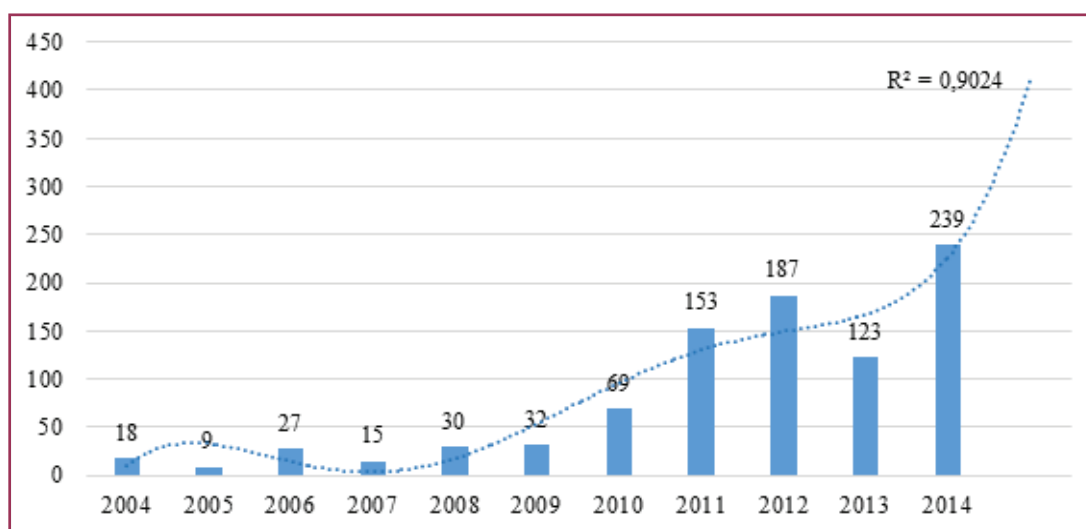
19 The groups that did not include the established filter had the following publication performance: nine articles (one group); eight articles (four groups); seven articles (seven groups); six articles (12 groups); five articles (12 groups); four articles (15 groups); three articles (37 groups); two articles (64 groups); one article (250 groups).

20 The role played by research groups and their effective contributions to scientific development is still little studied in Brazilian scientific journalism, lacking a higher quality debate and demanding specific research.

Therefore, it is essential that other groups seek to increase the number of their researchers and their collaborative networks in order to improve production and increase productivity. These actions would enhance their “scientific competitiveness” (MOCELIN, 2009), enabling breakthroughs in research of sociocultural and pedagogical nature, as movements in the field would be empowered by qualified circulation of distinct scientific practices and/or even competitors. At the same time, it is important to value and understand the experience accumulated by the groups that have contributed greatly to the training of qualified researchers and consequently to the scientific development of the field.

Another relevant point about the behavior of this academic community can be seen in Figure 9, which shows research groups’ indexes of circulation in *Movimento*. A very peculiar situation becomes evident as we observe a highly intensified growth in the joint participation of those collectives of researchers in preparing one article in this journal.

Chart 9 – Circulation of research groups in articles in *Movimento*, 2004-2014



Source: Authors

Data in Chart 9 indicate substantial growth in the number authors associated with more than one research group in works published by *Movimento*, mainly from 2010 on. The association of multiple groups in the articles of the journal happens in three ways: first, through collaboration between authors or groups of authors with ties to different research groups; second, through the relationship of authors with more than one group as researchers or leaders, expanding their collaborative network; the third way brings together these two conditions, that is, different researchers who, through thematic affinities, have academic ties with more than one research group.

As pointed out by Mocelin (2009), the increase in those cases can be interpreted as a way to improve production performance by increasing scientific competitiveness, enabling a more qualified performance in the share of financial and/or symbolic resource distribution, which may contribute to consolidate collective work in the sociocultural and pedagogical subarea. However, taking as a reference the collaboration index presented by that scientific community, it is possible to sustain that collective research still has much to be developed in the field.

Therefore, the growth of such research groups in articles published by *Movimento* might not yet be a consolidated scientific culture in the field of Physical Education. This behavior may

be strongly associated with the need for academic survival, given Brazilian scientific policies, thus causing researchers to act fairly close to the limits of the “possible mediocrity”²¹ or indeed consolidate scientific collaboration practices not yet experienced in the sociocultural and pedagogical subfield.

This movement should be followed by the necessary caution to avoid the negative effects of artificial fabrication of academic productivity. However, it is undeniable that interesting possibilities emerge from this scenario, since the trend of growth in multi-author scientific production (Chart 6) can enhance collaborative work between research groups, making scientific relations more complex and enhancing effective production of networked knowledge in the sociocultural and pedagogical subarea of Physical Education.

9 INSTITUTIONAL TIES

After observing institutional ties of articles published by *Movimento* in 2004-2014, we found the circulation of 257 institutions, including Higher Education Institutions (HEIs) both public and private, state and municipal education departments, federal institutes, and other private institutions.²²

Of that amount, 72% (185) are national and 28% (72) are foreign, and the journal published articles from institutions located in Latin and North America, Europe and Oceania. Considering the extension of Brazilian territory as well as the amount of HEIs in Brazil, it is possible to say that *Movimento*’s editorial project has succeeded in internationalization.

We carried out a survey of institutions that published more research²³ in *Movimento* during the period under review. Based on the criteria established, Table 3 presents 17 institutions with the most publications in the journal, appearing in 429 articles (80.79% of the total), which indicates inter-institutional partnerships. Importantly, most publications come from public universities²⁴ with graduate programs that have consolidated sociocultural and pedagogical lines. There is also a high number of institutions located in Brazil’s South and Southeast, setting up a situation of endogeneity necessary²⁵ to the area of Physical Education. However, one must understand that the volume of research coming from those regions is important to the field.

In view of Brazil’s economic distribution, it is to be expected that the most qualified scientific research comes from scientific centers enhanced by graduate studies’ policies.

It is also noteworthy that the geographical concentration of the programs existing in Brazil’s South and Southeast regions has caused and continues to cause that the choice of a different area program often did not happen by choice but by necessity, sometimes as the only alternative for acquiring more education (SILVA, 2005, p. 63).

This situation also explains the low circulation of articles by researchers from other regions, since it expresses the difficulty of generating resources and structures to enable the development of post-graduate at master’s and doctoral levels outside major political and

21 See Lovisolo (2003).

22 Clubs, sports schools and fitness centers.

23 We used the same procedures adopted for the organization of research groups, considering institutions that have accumulated ten articles between 2004-2014.

24 The only exception in higher performance institutions in the journal is the now defunct University Gama Filho.

25 Understood as a practice that favors quantitative and qualitative increase of the area.

economic centers in Brazil. As we noted in Table 3, the UFG appears as the only university that is not located in the South and Southeast, with ten articles published.

Table 3 – Institutions that published the most articles in *Movimento* in 2004-2014

Institution	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
UFRGS	1	8	5	6	3	10	13	2	7	3	7	65
UFES	4	2	3	1	3	4	5	9	7	7	4	49
UNICAMP	1	2	1	4	2	6	4	5	8	7	5	45
UFSC	-	2	3	3	5	6	7	2	2	5	4	39
UFPR	1	1	1	2	3	2	7	8	2	4	6	37
UFRJ	1	2	-	2	1	6	4	6	2	-	7	31
UGF	1	1	2	2	1	3	6	3	5	-	-	24
USP	-	-	1	1	1	7	1	2	3	-	5	21
UNESP	-	-	1	-	2	1	-	1	1	4	6	16
UFMG	1	-	-	-	2	1	-	-	2	2	7	15
UFPEL	-	1	1	1	1	1	3		3	3	1	15
UFSM	-	-	1	1	2	5	1	1	2	1	1	15
UEM	-	1	-	1	4	1	-	2	2	-	3	14
UEL	-	-	2	2	3	2	1	-	1	-	1	12
UFG	1	1	-	-	-	-	2	2	1	1	3	11
UDESC	-	-	-	-	3	1	2	3	1		-	10
UFJF	-	-	1	1	-	-	-	2	2	1	3	10

Source: Authors

The data also highlighted exogeneity in *Movimento's* articles, since 12.1% of its publications came from its own university. This finding emphasizes the scientific maturity of this medium in the field of Physical Education, to the extent that, within the country's economic and regional limits, there is institutional heterogeneity in the flow of publication in editions of this journal.²⁶

10 FINAL REMARKS

The data presented in this study allow us to point out some clear features of journal *Movimento* and the scientific community that publishes in it.

Even with the "crisis" in Brazilian scientific journalism, this journal has maintained regular frequency and punctuality. This factor, combined with its compliance to CAPES's guidelines for scientific journals, allowed it to position itself at the second highest stratum in *Webqualis*.

This condition, enhanced mainly after 2007, transformed the journal into a strategic place for the flow of graduate scientific production in the sociocultural and pedagogical subarea of Physical Education, also appearing as a space for circulation of articles of border areas such as Education, Social Sciences and History.

Data indicate that most of the journal's articles do not cite funding sources. Editions related to organization of funding policies are thriving in different fields of knowledge, with

²⁶ A journal's endogeneity and exogeneity criteria has been varying substantially from one area to another. In the journal's classification event of 2013-2016, the Area 21 does not present criteria related to this issue.

strong tendencies to limiting investment due to Brazil's current political and economic situation. However, the funding situation found in articles published by the journal is more a matter of commitment between researchers and development agencies than lack of public or private financial support for those studies.

Author profile in *Movimento* appears in a dispersed manner, but with a strong growth trend toward collective works. Therefore, in the period analyzed, the collaboration index among researchers is still low (less than three per article), though the projection is that the scientific field becomes increasingly collaborative.

The growth in studies linked to groups stresses this argument, and even with ethical concerns that arise on research relations and authorial legitimacy, the possibilities for producing knowledge articulated in national collaborative networks are interesting. At the same time, it is important that groups strengthen their production, thus increasing plurality and qualified academic dialogue in the scientific field.

In terms of institutional origin, *Movimento's* publications are organized in an exogenic way, by circulating articles from institutions throughout the country and a significant amount of research by foreign authors. This situation indicates the maturity reached by the journal, pointing out the democratic characteristic of the knowledge it publishes, which has also given it more international visibility.

The scientific field is still significantly dependent on research developed in Brazil's economic centers, which in this study was understood as necessary to a science communication channel that excels in quality research. However, it stresses the importance of expanding economic and scientific policies to enhance research carried out in the "periphery" of the SNPG.

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