



ISSN : 1533-1520

GARDEN JOURNALS

*Journal of Qualitative Research in Business Law,
Eco-Fin, Accounting, and Statistics*

Vol. 24 . No.1 2024

Evaluation Strategies And Publishing Norms In The Field Of Health Sciences In Brazil

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ABSTRACT

Theoretical studies substantiate the existence of epistemic cultures in academic communities, as well as how they influence evaluation policies implemented on them. This work deepens the analyzes carried out by the authors in previous studies to improve the understanding of the changes that occurred in the publication practices of Health Sciences in Brazil between the years 2000 and 2014. It is a quantitative-qualitative investigation, in the experimental and longitudinal. Data on the scientific production of Health Sciences is collected from the Directory of Research Groups of the National Council of Scientific and Technological Assurance, and graphically represents the historical series of articles, monographs and analytical works, as well as reasons for national/international articles and articles/monographs, to identify and compare patrons. Documents from Area Committees (Capes) and Health Science Advisory Committees (CNPq) are analyzed and the evaluation criteria used are identified, examined and classified. The results indicate that the evaluation criteria contribute to promoting changes in the publication practices of Health Science researchers, specifically a significant increase in the percentage contribution of international



GARDEN JOURNALS

*Journal of Qualitative Research in Business Law,
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articles and a reduction of national, monographs and of complete works in analysis.

Keywords: Epistemic cultures; publishing practices; evaluation policies; Health Sciences; Brazil

INTRODUCTION

Studies on the sociology of scientific knowledge ^{1, 2, 3, 4}) show the existence of epistemic cultures within academic communities. *Knorr-Cetina* defines them as “those sets of practices, arrangements, and mechanisms bound together by necessity, affinity, and historical coincidence that, in a given area of professional expertise, make up how we know what we know. Epistemic cultures are cultures of creating and warranting knowledge”. ³) According to this author, epistemic cultures are “knowledge construction machines”, ³ ie, combinations of cognitive, rational or technical elements (e.g. nature of the phenomena studied, object of study, methodologies, models, theoretical paradigms) and social (e.g. evaluation systems, selection of communication vehicles). Epistemic cultures are rooted in the notion of practices; they refer to the standards and dynamics of researchers in their daily tasks, ie, they are norms or conventions that govern the production of knowledge, and being a scientist implies fitting into these practices.

The influence of technical, rational or cognitive elements is indicated by several studies ^{5, 6, 7, 8} that show consensus on the existence of two great epistemic cultures: “hard” sciences (Exact, Natural, Medical, Engineering) and “soft” sciences” (Human, Social, Artistic). The “hard” ones deal with phenomena in the physical world (outside the human mind), which are more universal,



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predominantly deterministic (it is possible to establish direct cause-and-effect relationships between the variables involved) and can be observed and verified through experiments; consequently, it is simpler to achieve consensus, as well as the emergence of dominant theoretical paradigms. The “soft” ones study mental states or conditions for these states, phenomena that are mostly stochastic (the cause-effect relationship is probabilistically mediated) and are quite dependent on the sociocultural context; therefore, it is more difficult to reach consensus and different theoretical paradigms emerge.

As a result, the methods and theories that work within the “hard” and “soft” sciences differ, which is reflected in the way research results are communicated. 8 , 9 , 10 , 11 , 12 The “hard” ones work under a dominant theoretical-methodological paradigm, their research is less flexible, more quantitative and rigorous, they communicate their results through a highly codified language, which uses uniform symbol systems ; therefore, they produce knowledge at a higher speed, requiring faster updating from researchers.

For their part, the “soft” ones, when studying stochastic phenomena, which are more dependent on the local or regional context, develop research under the influence of different theoretical currents, with a more qualitative focus, communicating their results through a less codified language. and unformed, which requires greater elaboration and argumentation and produces knowledge at a slower speed. Monographs respond better to these requirements: they are longer publications, writing, editing and reading take more time; its degree of updating is lower; their dissemination does not reach the level of articles, which makes them



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more appropriate for exposing more complex and settled knowledge, which requires more space.

As a result, two hyperareas (clusters of large areas) are formed: “hard” (Exact, Natural, Medical, Biological, Engineering), which communicate their research results, predominantly, through articles in journals (~6.5 to 8.5 articles for each book/chapter); “soft” ones (Social, Humanities, Linguistics, Literature, Art) that show greater balance in the production of articles and monographs (~0.8 to 1.5 in the same ratio). 9 , 10 , 11 , 13 , 14 , 15

However, the social component of epistemic cultures also plays an essential role. The option for one or another communication vehicle does not depend solely on rational, technical or cognitive elements, but also on social elements, mainly on obtaining recognition from peers and external pressures linked to evaluation by employing or development institutions. As *Knorr-Cetina* states ,¹⁾ the notion of practice emphasizes acts of knowledge creation, including how researchers generate and “negotiate” their research results. The perspective of “negotiation” is also mentioned by *Bourdieu* 16 when he asserts that the behavior of scientists responds to the notions of “accumulated scientific capital” and “scientific profit”; Researchers seek personal satisfaction and professional success by forming intellectual alliances with colleagues to obtain recognition, status and power, in the form of publications, funding, etc.

Systems that determine research funding and recognition based on academic performance influence publishing practices in two ways. First, they lead researchers to consider obtaining good results in evaluations as an end that they need to achieve at any cost; the link between reputation/funding and the number of



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publications encourages them to publish more at the expense of quality. 17) Second, when, induced by the evaluation criteria, researchers introduce changes to their publication practices. According to several studies, 13 , 18 , 19 the emphasis on the use of citation indicators from journals indexed in the main commercial databases as research evaluation criteria, particularly the Impact Factor (IF) of the *Journal Citation Report* (JCR), is promoting changes in these practices, especially a progressive concentration on journal articles, including in “soft” sciences. Researchers realize that publishing in high-IF journals brings greater rewards than publishing in other types of documents (books, chapters, event papers) and begin to prioritize it. Additionally, *Laudel* and *Glässer* 20 show that the competitive context, in which researchers work, makes them use such indicators to display their performance, feeding back this type of evaluation.

However, despite the arguments presented in the previous paragraphs, the main research funding bodies in Brazil, the Coordination for the Improvement of Higher Education Personnel (Capes) and the National Council for Scientific and Technological Development (CNPq), focus their attention, predominantly, in articles published in magazines and favor the IF to build Qualis Periódicos (QP) and evaluate the intellectual production of Postgraduate Programs (PPGs) and researchers. 10 Such behavior can influence areas of knowledge differently, generating distortions in the processes of evaluation, production and publication of science. 21 . 22

In previous studies 9 . 10 we used data from the Directory of Research Groups (DGP) on censuses of scientific production by Brazilian doctoral researchers in the



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*Journal of Qualitative Research in Business Law,
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period 2000-2014, to identify the publication practices of the eight major areas of knowledge of the CNPq, grouping -them into two hyperareas (“hard” and “soft”), already characterized here, according to their similarities. In the first, there was a balance between monographs, complete works in annals and articles (predominantly national ones). In the "hard" ones, articles dominated, mostly international ones, with a significant decrease in works in annals and an insignificant volume of monographs.

In this general context, a peculiarity was observed in the publication pattern of Health Sciences (CdS) researchers. Between the 2000-2006 censuses, the production of national articles predominated, however, from 2008 onwards, the increase in these began to be lower than that of international articles, which became the main form of communication in the 2008-2014 censuses. . While in the 2000 census the ratio between national and international articles was three to two, it was reversed in the 2014 census, becoming two to three (attachment).

This work deepens the analyzes carried out in previous studies, 9 , 10 in order to better understand this change. The discussions are based, on the one hand, on the graphic representation of historical series of Brazilian scientific production and on the identification and comparison of patterns in publication practices. On the other hand, in the identification, classification and analysis of the evaluation criteria used in the broad area of CdS. Section 2 details the methodological procedures; section 3 analyzes and discusses the results and, in section 4, the final considerations are presented.



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METHODS

This is a quantitative-qualitative, non-experimental and longitudinal study. The research was carried out in two phases. In the first, data on Brazilian scientific production were collected, processed and graphically represented by type of documents and major area of knowledge, based on censuses carried out by CNPq between 2000 and 2014. This representation made it possible to identify, characterize and compare publication practices of CdS and “hard without CdS” and “soft” hyperareas. In the second phase, a documentary analysis was carried out to identify the evaluation criteria used by the Capes Area Commissions (CAs) in the triennial evaluations of the PPGs (2010 and 2013), as well as documents from the CNPq Advisory Committees (CAS) to evaluate the granting of productivity grants. Finally, these criteria were related to the patterns identified in publication practices. The procedures are detailed below.

Collection, processing and graphical representation of scientific production by type of document

For the selection of the source, the collection of data, as well as the choice and calculation of the variables represented graphically, we started with the methodology used in previous studies. ⁹⁻¹⁰ *Publication practices* are defined as the particular ways in which researchers communicate their results. It is a complex phenomenon, made up of several dimensions, which were operationalized by several families of variables. While families *a*, *b* and *c* were used in previous studies, in the present work a fourth family (*d*) was added :



- a. *Absolute quantity of each of the following types of publication:* national articles (A_n); international articles (A_i); complete works in annals (T); book chapters (M_c); and books (M_1).
- b. *Total absolute quantities:* of articles (A) (national plus international); of monographs (M) (books plus chapters); and production (P) (sums of the quantities of all products).
- c. *Percentage contribution:* of national articles (a_n); of international articles (a_i); of complete works in annals (t); of book chapters (m_c); and books (m_1) for the total production of the area.
- d. *Reasons:* between total articles and monographs ($R_{A/M}$) and between total national and international articles ($R_{An/Ai}$).

The variables in item *a* were extracted manually (in September 2017) from the DGP (<http://lattes.cnpq.br/web/dgp/producao-cta>), *Scientific, Technological and Artistic Production (CT&A) tables of Brazilian doctoral researchers*, available according to the type of production and the broad area of knowledge (the system does not offer data by area or subarea), and correspond to the censuses completed in the years 2000, 2002, 2004, 2006, 2008, 2010 and 2014. The transfer of data into an Excel document allowed the creation of seven spreadsheets, one for each of these censuses, with the help of which the variables mentioned in items *b*, *c* and *d* were calculated. Still using Excel, graphs of the historical series of variables were constructed for each large area, and the “soft”, “hard” and “hard without CdS” hyperareas. The following stand out in this work:

- Scientific production in articles (national + international), monographs (books + chapters) and complete works in



annals in the CdS and in the “soft” hyper-areas (Social, Humanities, Linguistics, Literature and Arts) and “hard without CdS” (Extas and Land, Agrarian, Biological, Engineering and Computing).

- Percentage contributions to the total production of *articles* (national + international), *monographs* (books + chapters) and *complete works in annals* in the CdS, and in the “soft” and “hard without CdS” hyper-areas.

Document analysis

Document analysis was not carried out in the two previous studies. It is now used to characterize the evaluations of productivity scholarship holders, carried out by CNPq, and that of PPGs, carried out by Capes, in the large CdS area. The search for documents took place in September 2017, having recovered: from CNPq (<http://cnpq.br/criterios-de-julgamento/>), the Nursing CAS documents; Pharmacy; Medicine; Physical Education, Speech Therapy, Physiotherapy and Educational Therapy; Dentistry; Public Health and Nutrition, corresponding to the analyzes for granting productivity grants in the period 2015-2017; from Capes, the documents from the Physical Education CAs; Nursing; Pharmacy; Medicine I; Medicine II; Medicine III; Nutrition; Dentistry and Public Health, corresponding to the 2010 and 2013 triennial assessments (<http://www.capes.gov.br/avaliacao/sobre-as-areas-de-avaliacao>). In both cases, there were no other documents corresponding to the period analyzed.

The documents were downloaded, read and analyzed one by one, allowing the identification and classification of the evaluation criteria according to the funding body (Capes or CNPq), the analysis period (2010, 2013, 2015-2017) and the



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evaluation area (CA or CAS of Nursing, Nutrition, etc.). The types of publications considered in the evaluations (articles, monographs or works in annals) and the specific requirements for each one were identified. In the case of CNPq, the criteria were further categorized considering the type of productivity fellow PQ1A, PQ1B, PQ1C, PQ1D, PQ2; Senior Research Productivity Fellows (PQ-Sr) were not considered. In Capes, given that there was data from the 2010 and 2013 triennial assessments, the existence of quantitative or qualitative changes from one to the other was analyzed.

RESULTS AND DISCUSSION

Standards in publishing practices

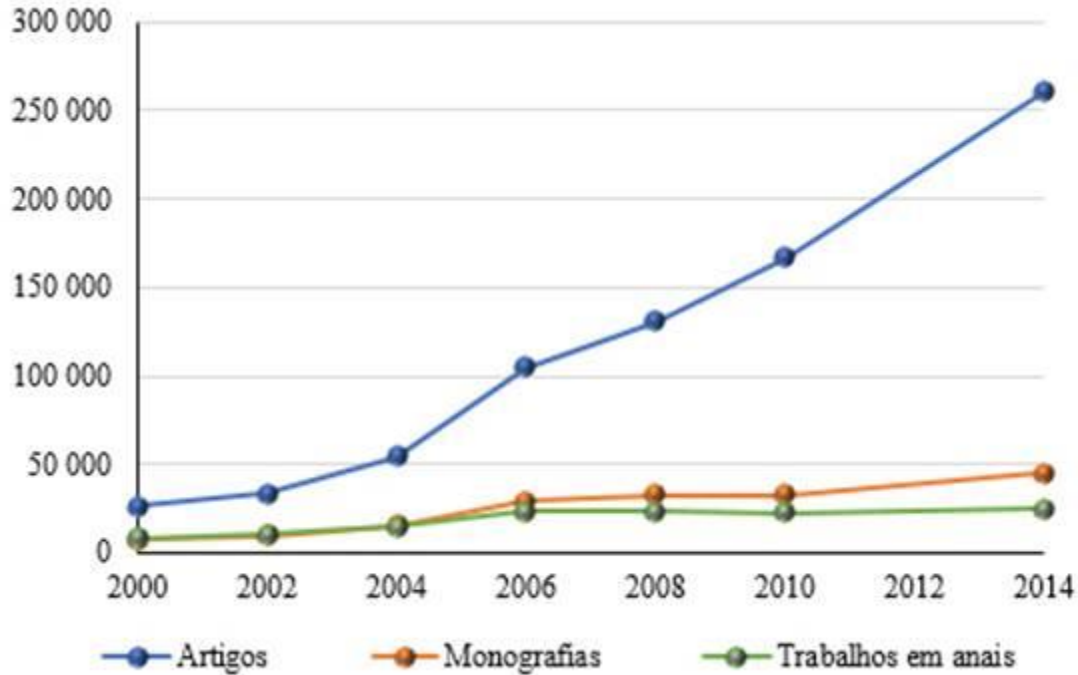
In [figures 1](#) , [2](#) , [3](#) and [4](#) , the historical series of absolute production and the corresponding percentage contribution of articles, monographs and works in annals, in CdS and in the “hard without CdS” and “soft” hyperareas, respectively, are presented. The data can be found in the annex.



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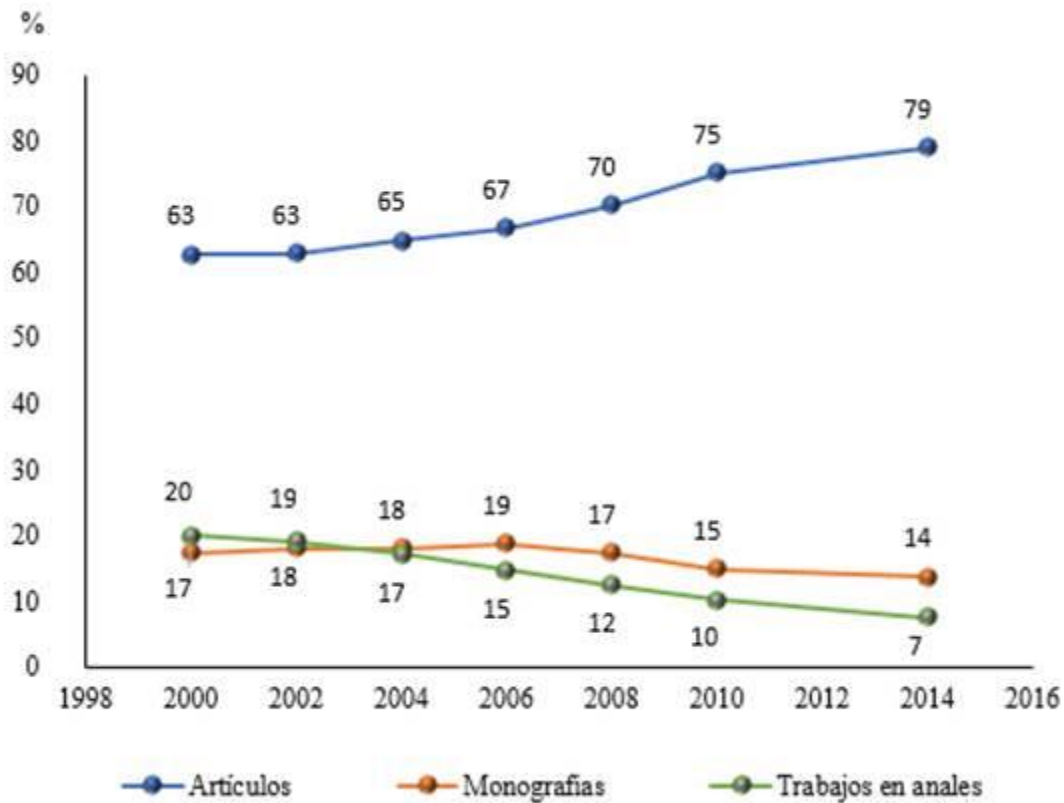
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Eco-Fin, Accounting, and Statistics*

ISSN : 1533-1520



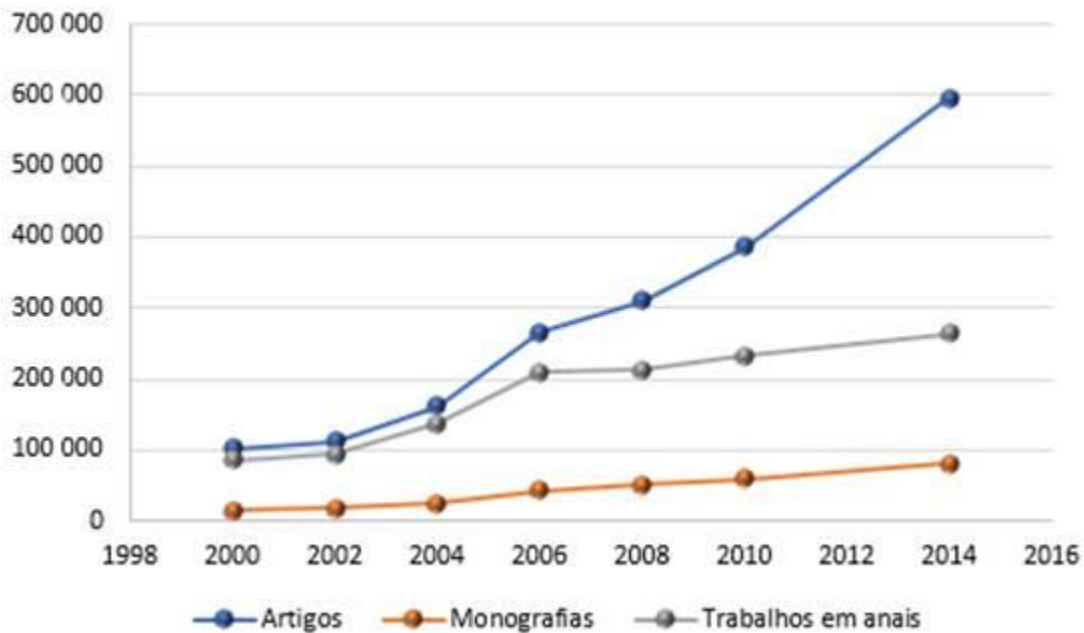
Source: Research data (2017).

Fig. 1 Production in articles, monographs and works in CdS annals (2000-2014 censuses).



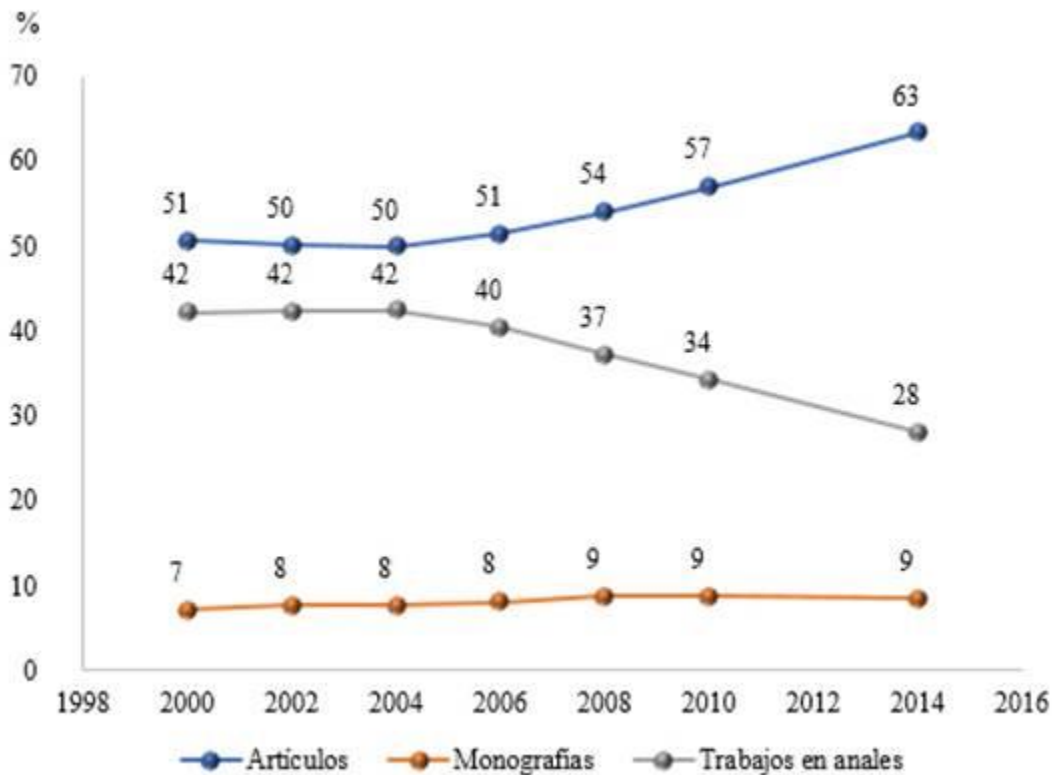
Source: Research data (2017).

Fig. 2 Percentage contribution of articles, monographs and works in annals to the total production of CdS (census 2000-2014).



Source: Research data (2017).

Fig. 3 Production in articles, monographs and works in annals of “hard sciences without CdS” (census 2000-2014).



Source: Research data (2017).

Fig. 4 Percentage contribution of articles, monographs and works in annals to the total production of “hard sciences without CdS” (2000-2014 censuses).

The figures allow us to identify similar patterns in the publishing practices of CdS and “hard sciences without CdS” throughout the period analyzed. In both cases, articles constitute the main type of product, contributing mostly and increasingly to the total production. In CdS its contribution went from 63% in the 2000 census to 79% in the 2014 census and in the “hard sciences without CdS” from 51% in 2000 to 63% in 2014. Likewise, the contribution of works in annals decreases significantly in a and others; in CdS it decreased from 20% in the 2000 census to just 7% in 2014, being included below monographs; in “hard courses without CdS” the decrease went from 42% in 2000 to 28% in 2014. Finally, the variation in the



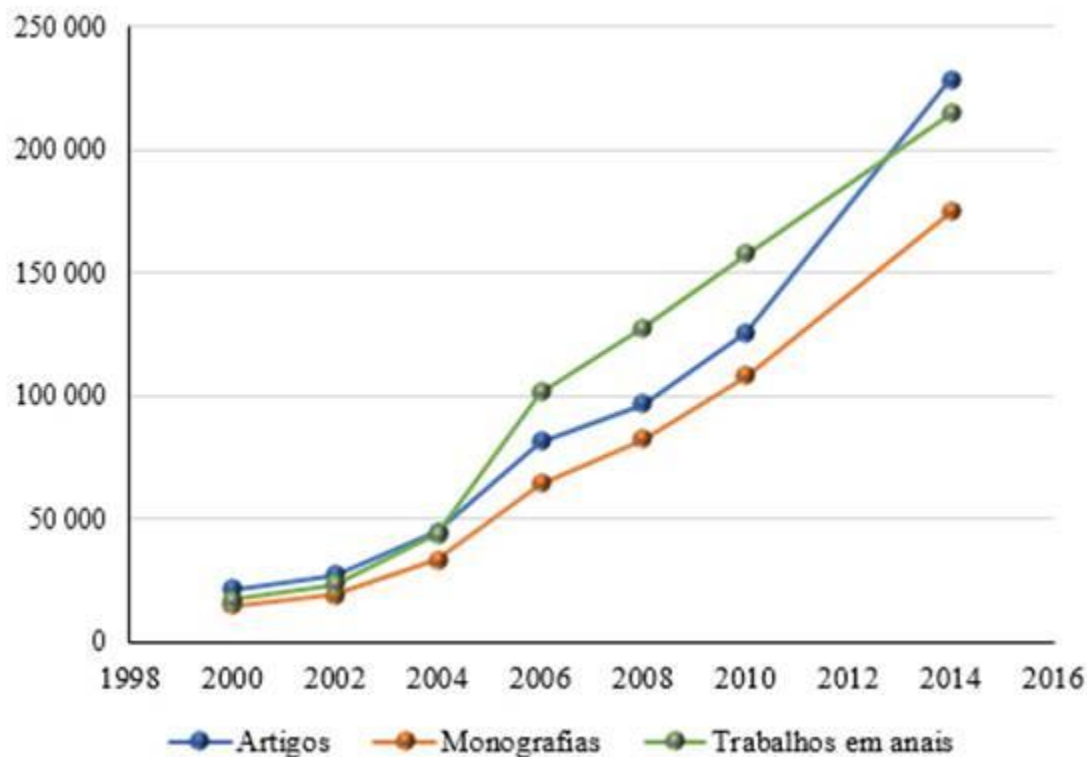
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contribution of monographs is not very pronounced; in CdS it varies between 14 - 19% and in “hard without CdS” between 7-9%.

Differently, in the “soft” sciences ([Fig. 5](#) , annex), a balance is identified between the three types of publication. Articles and works in annals alternate as dominant, the former contributing 37-40% of total production in the 2000-2004 and 2014 censuses and the latter accounting for 40-42% of this production between 2006 and 2010. The contribution of monographs it is stable, but much more significant (26-28%) than in the “hard” ones.



Source: Research data (2017).

Fig. 5 Production in articles, monographs and works in annals of “soft” sciences (2000-2014 censuses).



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Despite the similarity in the patterns of CdS and the “hard without CdS” hyperarea, additional analyzes show that the publication practices of the former did not faithfully correspond to those of the latter. The annex presents the ratios $R_{A/M}$ (between total articles and monographs) and $R_{An/Ai}$ (between international and national articles) for the CdS and the “hard without CdS” and “soft” hyperareas, respectively.

In the 2000-2006 censuses, the $R_{A/M}$ ratio in CdS presents a value very close to 3.60, that is, they produced ~3.50 articles for each book or chapter, an intermediate value between those in the “hard sciences without CdS” (average 6.6) and “soft” ones (average 1.4). From then on, it started to grow, reaching 5.78 in 2014, already very close to the “hard” standard; ie, from the 2006 census onwards, the CdS began to change their publication profile, increasing the production of articles more significantly than the production of monographs. It should be noted that the production of articles in CdS grew from 104,806 in the 2006 census to 260,543 in the 2014 census (~249%), while that of monographs increased from 29,322 to 45,080 (~53%) in the same period.

The guidance on publishing articles has also undergone an important change. Data on the $R_{An/Ai}$ ratio in the CdS show that, in the 2000-2006 censuses, its value ranged between 1.20-1.90 (average 1.52, or ~3 national articles for every two international ones), different values, both the “hard without CdS” pattern (average 0.75) and the “soft” standard (average 6.09), but reflecting a typical characteristic of the latter: mostly national orientation. However, also from the 2006 census onwards, $R_{An/Ai}$ values began to decrease, indicating a more pronounced growth in international orientation, reaching 0.65 in 2014, equivalent to the average value of



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*Journal of Qualitative Research in Business Law,
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ISSN : 1533-1520

“hard sciences without CdS” (average 0.66) and further from the “soft” ones (average 5.98). During this period, while the production of national articles increased by ~79%, going from 57,141 (2006) to 102,309 (2014), that of international articles increased much more (~332%), going from 47,665 to 158 234.

The non-correspondence of CdS publication practices with any of the two hyperareas (“hard without CdS” or “soft”) in the 2000-2006 censuses is sustained due to the coexistence of areas with distinct epistemic cultures (Medicine, Dentistry, Pharmacy, Nursing , Nutrition, Public Health, Speech Therapy, Physiotherapy and Operational Therapy and Physical Education), which entails the use of different publication practices.²³⁾ Medical areas (e.g. Medicine, Dentistry) deal with objects of study and use theoretical-methodological tools that are more in tune with those of “hard” sciences, prioritizing the publication of articles. Other areas (e.g. Public Health, Physical Education) include objects of study more linked to social problems (e.g. health services, sexually transmitted diseases), whose methodological and conceptual development receives many contributions from Social and Human Sciences; therefore, they present greater balance in the production of articles, works in annals and monographs. *Carvalho* and *Manoel*²⁴ show that, between 2000-2003, Nursing, Physical Education, Speech Therapy and Public Health had several lines of research focused on social problems.

However, these arguments are equally valid for the 2008-2014 censuses, when there is a growing approximation of CdS publication practices to those of “hard sciences without CdS”. Evidently, the causes are multifactorial and the present



work does not intend to provide a total answer to this question. However, based on the theoretical elements already presented, it is plausible that one of the essential factors is evaluation policies, a hypothesis that is discussed below, based on the results of the documentary analysis.

Capes and CNPq evaluation policies

Both Capes and CNPq evaluate Brazilian science; however, the first has a collective focus, as it evaluates PPGs, while the CNPq is individual, aimed at researchers. The CA (Capes) documents indicate that five dimensions are evaluated:

- *PPGs proposal*: coherence; consistency; scope, updating of concentration areas; research lines; ongoing projects; curriculum proposal; PPG future planning; infrastructure for teaching, research and extension; self-evaluation.
- *Faculty*: faculty profile (titles, experience, number of permanent faculty, etc.); dedication of permanent professors to research and teaching; distribution of research and teaching activities among permanent professors; contribution of permanent professors to research and teaching activities (supervision, etc.).
- *Faculty, theses and dissertations*: relationship between the number of theses and dissertations defended and the permanent faculty; balanced distribution of guidance (theses, dissertations) among permanent teachers; quality of theses and dissertations considering the resulting publications (articles, books, etc.); proportion between training time and obtaining doctoral and master's degrees.



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- *Intellectual production*: quality of the intellectual production of permanent professors (articles in qualified journals, books, etc.); balanced distribution of production by permanent teachers; technical production, patents, etcetera.
 - *Social insertion*: PPG's responsibility and commitment to regional or national development; contribution to improving the quality of teaching (relying on research groups, educational and scientific dissemination actions, etc.); integration and cooperation with other PPGs (joint research projects, joint publications, organization of events, etc.); visibility and transparency of PPGs activities (website with updated information).

CNPq evaluates researchers who request funding for research in different modalities (research productivity, technological development, etc.). In particular, researchers who receive funding in the productivity modality are highly recognized scientists in their respective areas of activity, holding significant scientific capital, which is why they are the subject of analysis. Four dimensions are evaluated:

- *Scientific production and technological innovation*: number of publications (articles, complete works in event annals, patents, etc.).
- *Human resources training*: post-doctoral supervision; supervision of theses and dissertations; ongoing guidance; participation in newsstands.
- *Research projects*: direction and participation in research projects.
- *Relevant activity in S&T*: member of committees and councils; Awards and titles; scientific leadership; ad hoc advice; event organization; coordination of PPGs; post doctoral; international insertion; participation in editorial, scientific management or administration activities of institutions and centers of excellence.



As happens in other major areas, each CA and CAS of the CdS evaluates these dimensions independently, assigning each one a specific weight that varies (0 - 100%); however, scientific production is the most valued element, reaching 35-40% in CA and 50-70% in CAS. The evaluation of the latter is carried out through a group of tools known as the "Qualis family": Qualis Periodicals (QP) for publishing articles; Qualis books (RCL) for monographs (books, chapters); Qualis Artístico (QA) for artistic production (music, visual arts, etc.)^{25,26,27} and until 2009, Qualis Eventos (QE) for works presented at a selection of congresses, workshops, etc.²⁷ However, both in the case of Capes and CNPq, the predominant use of QP as an evaluation tool is evident.

Table 1 allows us to appreciate that, while 100% of the CAs considered articles in the evaluations of PPGs in 2010 and 2013, with monographs or works in event annals the situation is different. Only Physical Education, Pharmacy and Public Health (33%) considered the monographs in 2010 and 2013; Nursing stopped considering monographs in 2013; Nutrition was created only in this assessment. Of these, only Physical Education and Pharmacy did not establish requirements for their assessment; Nutrition and Public Health only accept publications of a scientific nature; other types of publications (technical, dissemination, didactic) are not considered. The rest of the CAs (67%) consider monographs as technical production or another type of production and, therefore, do not score in the evaluations. The contrast increases with the works in annals; no CA considers this type of publication.

Table 1 CA of CdS that consider articles, monographs and works in annals in the evaluations of PPGs (2010 and 2013)



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CA	Artigos				Monografias				Trabalhos co	
	Consideram		Requisitos específicos		Consideram		Requisitos específicos		Consideram	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
E Física	X	X	X	X	X	X	-	-	-	-
Enfermagem	X	X	X	X	X	-	X	-	-	-
Farmácia	X	X	X	X	X	X	-	-	-	-
Medicina I	X	X	X	X	-	-	-	-	-	-
Medicina II	X	X	X	X	-	-	-	-	-	-
Medicina III	X	X	X	X	-	-	-	-	-	-
Nutrição*	-	X	-	X	-	X	-	X	-	-
Odontologia	X	X	X	X	-	-	-	-	-	-
S Coletiva	X	X	X	X	X	X	X	X	-	-

* The Nutrition CA did not exist in the 2010 triennial assessment.

Source: Documents from the CA (Capes) of the CdS in the three-year assessments (2010 and 2013).

In turn, [table 2](#) shows that, while all CAS require researchers to have published a specific number of articles, only Public Health and Nutrition accept monographs; however, they only score monographs published by university or commercial publishers of recognized prestige. No CAS considers works in annals.

Table 2 CAS (CNPq) that consider articles, monographs and works in annals in the evaluations for granting productivity grants (2015-2017)



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CAS (CNPq)	Exigem artigos			Exigem monografias
	Quantidade	Estratos do QP	Em revistas com FI	
Enfermagem	P2-10 nos últimos 5 anos; P1D-25 anos último 10 anos; P1C e P1B-30 nos últimos 10 anos; P1A-35 nos últimos 10 anos	A1; A2; B1; B2	X	-
Farmácia	P2-20 nos últimos 5 anos; P1D, P1C e P1B-40 nos últimos 10 anos; P1A-70 nos últimos 10 anos	Não especificado	X	-
Medicina	P2-6 nos últimos 5 anos; P1D, P1C, P1B e P1A-10 nos últimos 10 anos	Não especificado	X	-
E Física, Fonoaudiologia, Fisioterapia e Terapia Ocupacional	P2-8 nos últimos 5 anos; P1D-15 nos últimos 10 anos; P1C, P1B e P1A-20 nos últimos 10 anos	Não especificado	X	-
Odontologia	P2-5 nos últimos 5 anos; P1D, P1C, P1B e P1A-20 nos últimos 10 anos	Não especificado	X	-
S Coletiva e Nutrição	P2-10 trabalhos científicos nos últimos 5 anos; deverão ser artigos ou monografias (livros ou capítulos) Os artigos em periódicos A1, A2, B1 e B2 As monografias publicadas por editoras reconhecidas universitárias ou privadas P1D, P1C, P1B, P1A-30 trabalhos científicos nos últimos 5 anos; deverão ser artigos ou monografias (livros ou capítulos) Os artigos em periódicos A1, A2, B1 e B2 As monografias publicadas por editoras reconhecidas universitárias ou privadas			



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Source: Documents for the granting of productivity grants from the CAS (CNPq) of the CdS in the period 2015-2017.

The discussion presented in the preceding paragraphs shows the preponderance attributed to articles in the evaluation of CdS, the relative little importance given to monographs and the total disregard of works in annals. These elements are in accordance with the percentage production patterns identified and analyzed in section 3.1: more pronounced growth in article production; stable production, but not very representative of monographs and; rapid decrease in the contribution of works in annals.

Qualis Periodicals: criteria and questions

The importance given to articles implies that the form of organization of the QP influences the behavior of researchers. The classification is organized by each CA and is available online through the Sucupira platform (<https://sucupira.capes.gov.br/sucupira/>). Provides a list of journals in which PPGs in a given area have published a minimum number of publications. The magazines are classified into strata indicating quality - A1, the highest; A2; B1; B2; B3; B4; B5 and C. Each stratum assigns a certain number of points for each article that was published in a journal that falls within it (for example, A1 = 100, A2 = 85, ..., B5 = 10), except C, which scores zero. The quality of the articles is defined based on the classification of the journals in which they were published and, adding the scores for all permanent professors, there is an evaluation of the PPG's scientific production in this regard. ²⁷

This mechanism promotes publication in journals located in the upper strata of the QP; the greater the number of publications from a PPG in these strata, the higher



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Eco-Fin, Accounting, and Statistics*

ISSN : 1533-1520

the score the program will obtain in the evaluation. From this perspective, it is essential to clearly delimit the strata in order to classify journals and score articles. *To this end, the four dimensions of quality of scientific journals identified by Trzesniak are essentially considered :* ²⁸

- *Technical-normative:* compliance with technical standards (national or international) that must be complied with by journals. *Criteria:* have ISSN; editorial board; responsible editor; editorial policy; rules for presenting articles; offer information about the authors, their institutional affiliation, summary, keywords, etc.
- *Purpose of the magazine:* ensures that the magazine meets its purpose with the highest possible quality. *Criteria:* peer review; have a highly qualified, institutional and geographically diverse Scientific Editorial Board; ad hoc consultants; Institutional Support; among other elements.
- *Production process:* associated with the execution of editorial procedures in a systematic, complete, efficient, effective and transparent manner. *Criteria:* have regulations; parameters established for the selection of editors; peer review forms; editorial process flowchart; quality procedures manual; regular periodicity, etcetera.
- *Market:* quality that authors, consumers or users attribute to journals. *Criteria:* use of quantitative citation count indicators (JCR IF, Scopus h Index, etc.); indexing in highly visible databases (WoS, Scopus, etc.); publication in electronic format, among others.

Each CA freely defines the criteria to evaluate these dimensions and, on this basis, classifies the journals into the corresponding strata. Table [3](#) shows the distribution



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of the criteria most used by CAs in the 2010 and 2013 assessments. [Table 4](#) details the most used databases. It is observed that there are criteria considered by all CAs, specifically, those that "formally" characterize a scientific journal (technical-normative and peer review). Quality publications that do not meet these requirements are not designed; establish minimum criteria for including a journal in strata A1-B5 and consequent scoring for the articles published in it. Non-compliance places the magazine in stratum C, whose articles do not score. However, these criteria do not define the gradation of the strata; This considers market dimension criteria, highlighting quantitative indicators and indexing in databases due to their majority use. Among the quantitative indicators, the FI (JCR) used by all CAs predominates; the H index and Citations per document are much less used and are always monitored by the FI. An increase in this trend was observed from 2010 to 2013; Pharmacy, Medicine I, II, III, and Dentistry increased the value of the IF that delimits the upper and lower level of the strata and the number of strata that require publications with IF; Public Health reduced the number of strata defined by FI, but increased its value; Nursing did not increase the value, but the number of strata defined by FI. Only Physical Education did not make changes.

Table 3 Quality criteria most used by CdS CAs to classify journals in the QP (2010 and 2013)



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CAs (Capes)	Técnico-normativa		Finalidade		P produtivo		Mercado			
			Revisão por pares		Periodicidade regular		FI (JCR) e suas variantes		Índice H (Scopus)	
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013
Educação Física	X	X	X	X	-	-	X	X	X	-
Enfermagem	X	X	X	X	-	-	X	X	X	X
Farmácia	X	X	X	X	X	X	X	X	-	-
Medicina I	X	X	X	X	-	-	X	X	-	-
Medicina II	X	X	X	X	-	-	X	X	-	-
Medicina III	X	X	X	X	-	-	X	X	-	-
Nutrição*	-	X	-	X	-	-	-	X	-	X
Odontologia	X	X	X	X	-	-	X	X	X	-
Saúde Coletiva	X	X	X	X	-	-	X	X	X	X

*Nutrition did not exist in the 2010 evaluation. FI (JCR) and its variants - in addition to using FI (JCR), some CA combine this indicator with the median FI of all magazines analyzed.

Source: CA documents (2010 and 2013).

Table 4 Databases most used as stratification criteria in the CdS QP (2010 and 2013)



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CAs (Capes)	A1		A2		B1		B2		B3		B4
	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010
E Física	1, 2	1	1, 2	1	1, 2, 3, 6	1, 3, 4, 6	3, 5, 6	1, 3, 5	5, 6	1, 3, 4, 5, 6	6
Enfermagem	1, 2	1, 2	1, 2	1, 2	1, 2, 6	1, 2, 6	3, 6	3, 6	5, 6	5, 6	6
Farmácia	1	1	1	1	1	1, 2	1	1, 2	1, 2	1, 2	2
Medicina I	1	1, 2	1	1, 2	1	1, 2	1	1, 2	6	1, 2	3
Medicina II	1	1, 2	1	1, 2	1	1, 2	1	1, 2	1, 6	1, 2	3
Medicina III	1	1, 2	1	1, 2	1	1, 2	1	1, 2	1, 6	1, 2	3
Nutrição*	-	1, 2	-	1, 2	-	1, 2	-	1, 2	-	3, 6	-
Odontologia	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2, 3	1, 2	2, 3, 6	1, 2, 3, 6	5, 6
Saúde Coletiva	1, 2	1, 2, 3	1, 2	1, 2, 3	1, 2, 3	1, 2, 3	2, 3	1, 2, 3	2, 3	1, 2, 3	2, 3, 5, 6

* Nutrition did not exist in 2010. Legend: 1-WoS; 2-Scopus; 3-SciELO; 4-SJR; 5-LILACS, 6-Others (CUIDEN, Medline, PUBMED, EMBASE, ERIC, LATINDEX, SPORT DISCUSS, etcetera).

Source: CA documents (2010 and 2013).

Indexing in databases is also a criterion used by all CAs; It is recognized that the greater the number of indexings of a journal, the greater the visibility of its articles,



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increasing the possibility of them being found, consulted and cited. However, it is observed that the classification in the upper strata of the QP (A1-B1) favors journals indexed in the most recognized commercial databases (WoS and Scopus), belonging to private companies in the northern hemisphere. In 2013, only Public Health included SciELO in strata A1, A2 and B1; Physical Education incorporates Medline, SciELO and SJR in B1 and Nursing also incorporates CUIDEN in B1. In the lower strata, other bases appear, such as SciELO, LILACS, etcetera.

The preponderant use of IF and indexing in WoS and Scopus as essential criteria to stratify scientific production, contribute to the identified publication patterns, particularly with regard to the accelerated growth of international articles, in relation to national ones; one must consider the productivity requirements to which PPGs and researchers are subjected and the disproportion between the number of international and Brazilian journals that meet these requirements.

The situation described so far indicates that evaluation in CdS is dependent on three criteria that, according to the analyzes carried out, contributed to changes in publication practices: the preponderant use of QP as an evaluation tool, the IF (JCR) and indexing in WoS and Scopus, as essential indicators of the quality of publications. The materialization of these changes reflects the effectiveness of Capes and CNPq evaluation policies aimed at increasing the visibility of Brazilian science.

However, it also raises problematic issues. As *Santos* and *Kobashi* state “(...) scientific activity cannot be reduced to the production, circulation and consumption of journal articles and, much less, confuse the quantitative growth of articles with the cognitive development of science”.²⁹ By placing monographs and works in



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annals in the background, a portion of the scientific production of CdS is disregarded, which, despite being intentionally devalued, in the 2014 census still represented 21% of the total volume of production (Fig. [2](#)).

Monographs and works in event annals are traditional forms of scientific communication that respond to certain requirements of the processes of production and dissemination of knowledge. The first allow the exposure of more complex knowledge that requires greater elaboration and space; the second presents preliminary results allowing researchers to obtain feedback and fine-tune their work. Arguing that these are types of publications that do not undergo rigorous review processes is a generalization that does not fully adjust to reality; as shown by *Meadows*, [12](#)), there is evidence that this happens, but also that many publishers and events subject communications to evaluation processes as severe as those of magazines. The real problem is the lack of indicators to evaluate both types of production. Evaluators need to review many publications in a short period of time, therefore, they rely on bibliometric “shortcuts”; while for articles there is a variety of indicators available, in the case of monographs and works in annals this is not the case.

Another problem is the basis that supports the QP. Evaluating scientific production based on the quality of journals takes the focus away from the essential issue: the quality of articles. Journals are predominantly evaluated through the IF. However, when this indicator reaches prominent values it does not mean that all articles in the journal are of high quality; It is enough for an article to reach a high number of citations for the “success” to be transmitted to the journal and, “automatically”, to the other articles published in it. The FI does not guarantee the quality of the



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articles, which, strictly speaking, invalidates its use as an essential criterion to delimit the upper strata of QP.

Additionally, taking the IF and indexing in WoS or Scopus as a basis for stratification compromises the inclusion of Brazilian CdS journals in the upper layers of the QP, subjecting national science to the interests of private companies. A similar approach may favor areas closer to “hard” sciences, however, it has a negative impact on those that develop research more linked to local or regional social problems. [21](#), [22](#)

And there is even more. The Qualis tools were created within the scope of Capes to evaluate the production of PPGs, currently four-yearly and three-yearly until 2013. Once this evaluation was completed, Qualis for the finalized evaluation period fulfilled its role, and could be extinguished. Although it is expected that a magazine well ranked in a certain edition of QP will maintain its position in the next, there is no guarantee in this regard. For example, there are percentage limits for presence in strata A1, A1+A2 and A1+A2+B1. So, if new magazines enter A1 and/or A2, some of the ones that were there may fall to B2 or worse.

The first question is whether the tool for evaluating PPGs (collectives) can be applied to the evaluation of researchers (individuals). The second is that, in longer-term evaluations, a journal's ranking may have changed, so CAS would have to look at the publication date of each article and consider the PQ at the time. Most Capes areas generate two editions of the QP in each evaluation period, one intermediate and one final. To evaluate the PPGs, the final is worth it. For researchers, which one is worth it?

CONCLUSIONS



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In the period 2000-2014, CdS publication practices changed: in percentage terms, the contribution of international articles increased and that of national articles, monographs and complete works in annals decreased (all increased, however, in absolute numbers). The evaluation criteria used by Capes and CNPq are one of the factors that influenced this behavior. But the strategy that bases such criteria - privileging scientific production in high IF journals - rests on the presumption that this increases the quality of Brazilian science, a premise that, in the authors' view, still lacks foundation to be indiscriminately extended to all the areas. Scientific research not only has an intellectual impact (contribution to the common body of knowledge) but also a social one. Starting from an elitist vision may perhaps increase the impact of Brazilian science in the world, but it certainly does not motivate research aimed at solving social problems. Social interest is subordinated to that of commercial publishers whose main objective is often to make a profit.

A compromise solution, capable of considering these two visions in balance, would be for the areas that carry out research with greater social impact in Brazil to include, in the upper strata of the QP, a greater number of national journals, which publish quality articles, through rigorous editorial processes. . Additionally, Capes and CNPq must promote and value publications that have a significant social impact. A way to achieve this is discussed by Trzesniak.²²

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