The teaching area: drawing from Bourdieu's field theory*

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Abstract

Pierre Bourdieu's theoretical contributions pave the way for studying a wide range of social spaces, such as the academia. Through using Bourdieusian fields, our objective was to investigate whether the teaching area of the Coordination for the Improvement of Higher Education Personnel (CAPES) can be considered a relatively autonomous scientific field. Therefore, this study is motivated by two research questions: 1) what is the distribution of scientific capital in the teaching area; and 2) what are the implications of this distribution on its constitution as a scientific field. By crossing data on professors of programs in the field of education with the evaluation grade assigned by Capes to each of these programs, our analysis revealed that this area does not constitute a scientific field. Differently from what happens in well-established fields, most teaching advisors come from many different scientific backgrounds and do not recognize this field's specific intellectual production as scientific capital. Assuming that the existing disputes between professors with less and more scientific capital can generate new conformations in the area, a possible structure could be a stabilization of the subgroup of professors with greater scientific capital and its constitution as a scientific field, whose agents become increasingly aware that their cognitive structure and ideals of education/research are different from what Capes intended to homogenize with the creation of a teaching area. We believe that our results can be a reference for critical reflection on the structure of the field of teaching, which is still driven by its agents.

* The authors take full responsibility for the translation of the text, including titles of books/articles and the quotations originally published in Portuguese.

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Problematization

Research in the field of education is mainly characterized by its youth and multidisciplinarity. For it is a heterogeneous field that is probably still in formation, we have an exciting challenge in front of us: to investigate it using Pierre Bourdieu's field theory—which, according to the author himself, is a concept that is hard to articulate, thus rarely used to investigate scientific disciplines with such characteristics (BOURDIEU, 2013). In this sense, we might think of the field of education so it becomes a scientific field, through the distribution of scientific capital of professors who serve as advisors in postgraduate programs (PGPs) in this area.

Like in Bourdieu (1996), we shall first briefly explain the sociogenesis of this potential field, whose origin lies in the areas of mathematics and science teaching. Seen as strategic in Brazilian scientific-technological development, in the 1960s science education received substantial government funding for the elaboration of curricular projects and teaching resources based on North American references. In some universities, the mobilization of researchers who used these projects in teacher training and to design teaching laboratories ended up expanding their own research objects (OSTERMANN; REZENDE, 2020).

From the 1980s onwards, in the period of redemocratization process that took place in Brazil, the formation of research groups in universities intensified, fueled by funding to science teaching projects and, in particular, to the training of PhDs abroad. Such policies allowed a progressive increase in the number of research groups in the teaching of physics, chemistry and biology, which organized to found the Brazilian Association for Research in Science Teaching (Abrapec), as it was called back in 1997, when the 1st Research Meeting on Teaching Experiences (Enpec) took place. The creation of Abrapec brought to fruition the visions of a whole community of researchers in science education to organize an academic association that were independent of other education associations or scientific societies. It was the first step to encouraging autonomy in this academic area, a substantial push towards defining it as a scientific field.

In 1999, members of Abrapec and attendees of the second meeting of Enpec started to refer to Science Education rather than Science Teaching, which was not surprising nor required a justification whatsoever. In 2000, CAPES (Brazilian Coordination for the Improvement of Higher Education Personnel) created Area 48 (Science and Mathematics Teaching), which initially housed seven PGPs[3], and represented another important step towards emancipation as a viable field. Hitherto referred as a line of research in

3- Namely: (1) Science Teaching (physics, chemistry and biology), at University of São Paulo (USP); (2) and (3) Mathematics Education, at Pontifical Catholic University of São Paulo (PUC-SP) and São Paulo State University (Unesp), Rio Claro campus; (4) Science Teaching, at Federal Rural University of Pernambuco (UFRPE); (5) Science and Health Education, at Federal University of Rio de Janeiro (UFRJ); (6) Science Education, at UNESP (Bauru campus); (7) Teaching, Philosophy and History of Sciences, at Federal University of Bahia (UFBA).

postgraduate programs in education or in the original disciplines (physics, chemistry, biology and mathematics), Science and Mathematics Teaching came to be known as a field at CAPES (a development foundation that evaluates the master's and doctoral courses in our country). Another important milestone for understanding its formation was the creation of the first two professional master's courses in science/physics teaching at the Federal University of Rio Grande do Sul (UFRGS) and at the Federal University of Rio Grande do North (UFRN), in 2002.

In 2011, Area 46 was shut down by Capes, alleging external pressure from other PGPs in education (such as engineering, nursing, administration, etc.), which presumedly did not fit into any area when applying for grants. Area 46 is then replaced by "the teaching area" (remaining with the number 46), starting to be coordinated by scientists from different areas of specific content, thus housing different PGPs from that point onward[4].

Among so many reactions against the closure of the Science and Mathematics Teaching area by Capes, Abrapec stood out, which, at a more progressive moment than that of its foundation, organized numerous demonstrations against this measure, considering it a coup. In November 2011, as a way to establish some sort of contact with the programs, Capes held the "Seminar on monitoring graduate programs in teaching", attended by 65 coordinators and representatives of PGPs in teaching. On that occasion, issues related to how the programs would deal with such changes were framed, including a triennial evaluation and documenting the area. There was also the possibility of setting up chambers, with procedures, specificities and journals and their respective *quails* rating (official system for classifying scientific production). This measure aimed to allocate the science and mathematics teaching group in a specific niche in order to somehow preserve its identity. After a long discussion, four chambers were drafted, related to the Teaching of: (1) Science and Mathematics, (2) Health, (3) Engineering and Technology, and (4) Humanities, languages and social sciences. This was an attempt to encourage the creation of programs in these areas (RAMOS; SILVA, 2014). The proposal to split the teaching area into four chambers did not get far, which ended up ratifying the heterogeneous nature of the area.

In the documents related to the teaching area (CAPES, 2013, 2016, 2019), it is characterized as translational research, which not only meant the application of basic science in educational products and processes, but also aligned with a hegemonic vision:

> The programs in the teaching area focus on research (expressed in articles, books and works at events) and production (expressed in processes, materials, educational and social technologies, educational proposals, public policies) in *Teaching a certain content*, as a means of interlocution with the Areas of *knowledge to be taught*. Focusing on the integration between *disciplinary content* and educational knowledge is a specific – and one of the most important – features of the teaching area, or what is called content pedagogies. [...] Therefore, the teaching area is essentially about translational research, which looks for ways to build bridges between different academic

4- The list of 212 postgraduate programs in the Teaching Area according to Capes in 2019 can be found at the following address: https://bityli.com/sTQjAQ.

> knowledge in *education and teaching* for application in educational products and processes in society. (CAPES, 2013 *apud* CAPES, 2016, p. 2-3, emphasis in original).

The signifiers in italics show the commitment of the production of knowledge in the teaching area to the teaching of certain disciplinary content integrated with pedagogical knowledge. Education and teaching are taken as a sum of pedagogical knowledge that, when integrated to a specific content, will serve a single purpose, that is to be applied in educational products and processes. The academic or professional training of master's and doctoral students from the different programs in this area favored the profile of a developer of teaching resources or a teacher who is efficient in establishing educational processes. This form of applicationism and instructionism in training should be restricted to technical training, where political reflection on school, curriculum, education, science and society is not necessary. It is, at the very least, disappointing that the text above repeats in the most recent document on the teaching area, in 2019 (CAPES, 2019).

On the other hand, we see changes in the conception among researchers and graduate students within the scope of Abrapec and Enpecs. In the last editions of the event, there has been an increasing critical focus on science teaching, which is not exclusively tied to the development of teaching methods or materials. In the same way, the board of Abrapec reviewed its statute in 2017, starting to use only the expression "science education", and no longer "science teaching". However, the position of science education as the central object of the association is far from materializing in the teaching area, which reaffirms its condition as a subset of the former.

Capes created the teaching area by bringing together 29 academic master's programs,19 doctoral programs, and 30 professional master's programs of different natures, in what can be seen as a way of homogenizing it in a technicist manner. Thus, unlike in other areas of knowledge, the teaching area did not take the common path, and the artificially produced process did not lead to identity formation. The mere existence of a subgroup of researchers in science education who clearly do not identify with this vision, within the area, flags its vulnerabilities. These particularities motivated us to question whether or not the teaching area can be deemed as a field, following the Bourdieusian definition of scientific field, which can shed light on what these supposed weaknesses may actually mean.

Field and scientific capital, according to Bourdieu

We will start by asking how difficult it is for a scientist to study science, as Bourdieu puts it (1983c, 2017), in an approach to the sociology of scientific knowledge. According to the author,

> The sociology of science is so difficult only because the sociologist has a stake in the game he undertakes to describe [...]; he cannot objectify what is at stake, and the corresponding strategies, unless he takes as his object not simply the strategies of his scientific rivals, but the game as such, which governs his own strategies too and is always liable to exert an insidious influence on his sociology. (BOURDIEU, 1983c, p. 155).

In view of the aforementioned issue, we address it by explaining who we are: a small team of novice and experienced researchers, with training and experience in science education research and programs in the teaching area. To overcome the difficulties of this configuration, we present empirical data and theoretical interpretation, recognizing the influence of our positions and looking to surmount them through the use of analytical tools.

Bourdieu (2004a, p. 43) argues that this type of study is a way to "carry out science at the service of science" and breaking with "knowledge first, in a necessarily partial and arbitrary manner, as each one in the field perceives it with a certain lucidity, but from a point of view within the field, which they themselves cannot see". At the same time, it allows for breaking away from externalist perspectives, or "pseudo-erudite theories that, in an explicit sense, contain only one of the points of view about the field".

When it comes to the teaching area, we did not employ the term "field" as in Bourdieusian theory. We articulate this notion to interpret empirical data, but not as an immediate a priori symmetry. Thus, through the general and invariable laws of the fields and the specificities of the scientific field (BOURDIEU, 1983a, 1983c), we refine this research topic and interpret the empirical results that may or may not lead to the conclusion that it follows what Bourdieu understands as field. According to him (Bourdieu 2004a), field refers to a microcosm within the social macrocosm, which has its own laws. In his words, it is "an extremely simple idea, whose negative outcomes are quite evident" (BOURDIEU, 2004a, p. 20). He explains that, in order to "understand a cultural production (literature, science, etc.), it is not enough to analyze the textual content of that production, nor to refer to the social context, restricted to establishing a direct relationship between the text and the context" (p. 20). The right path would be "to assume that, between these two poles, very far apart [...], there is an intermediate universe that I call the literary, artistic, legal or scientific field" (p. 20). Therefore, by operating between macrocosm and microcosm, one can grasp the more or less specific social laws that govern values, actions and choices of agents that make up a field. According to the author, to articulate the notion of field in the context of sociology of science consists of seeing past false alternatives rooted in purely internalist or externalist explanations; it is to look for the specificities of the field in its relationships (BOURDIEU, 2004a).

As indicated earlier, the field is built on direct relationships between agents, and every field refers to a hardship between the dominant and dominated. It is worth recalling the Bourdieusian explanation to why his praxeological method disagrees with structuralist perspectives, as they can be understood as looking for ways as one follows roads drawn on a map (BOURDIEU, 1983b), i.e., although one can identify objective properties that define the field from the positions occupied by its agents, it does not have a physical or material existence. "Agents–for example, companies in the case of the economic field–create space, so space only exists (in some way) because of agents and the objective relationships between the agents that are there" (BOURDIEU, 2004a, p. 23).

These and other general and invariant field laws apply to the scientific field, though it also has a set of specific properties (BOURDIEU, 1983a, 1983c). In general, we can understand scientific or academic fields as scientific disciplines. The very delimitation of scientific field and of its importance refers to the disciplines, because the scientific field recalls that "there is a minimum of unity in science" and that "the different disciplines occupy a position in the (hierarchical) space of disciplines". Furthermore, Bourdieu (2004b, p. 75) explains that "each discipline (as a field) is defined by a particular nomos, or a principle of vision and division, a principle of reality that is irreducible to that of another discipline". Therefore, understanding research in the area of teaching as a possible field means conceiving it as a more or less autonomous discipline. Bourdieu (2004a, p. 21) directly associates the notions of disciplines, fields and autonomy, defending that "one of the differences between different scientific fields that is relatively easy to identify, but not always easy to measure, quantify—disciplines, as they say—, will, in fact, rely on degrees of autonomy". This is a key definition that will be resumed as soon as we explain what constitutes scientific capital, which, like the agents, defines the field.

Like in other fields, the scientific field is characterized by a dispute over a specific capital, which, in this case, is the scientific capital:

> As a system of objective relations between positions already won (in previous struggles), the scientific field is the locus of a competitive struggle, in which the specific issue at stake is the monopoly of scientific authority, defined inseparably as technical capacity and social power, or, to put it another way, the monopoly of *scientific competence*, in the sense of a particular agent's socially recognized capacity to speak and act legitimately (i.e. in an authorized and authoritative way) in scientific matters. (BOURDIEU, 1983c, p. 122-123).

This scientific authority or competence is a particular kind of capital that is specific to the scientific field and that implies the definition of what is at stake in the scientific struggle: "[...] the dominant are those who manage to impose the definition of science which says that the most accomplished realization of science consists in having, being and doing what they have, are or do" (BOURDIEU, 1983c, p. 128). Thus, the field separates into opposite poles the dominant, who have a greater volume of scientific capital, and "the dominated, i.e., the newcomers to the field, who possess scientific capital in an amount that (in absolute terms) increases in proportion with the accumulated scientific resources in the field" (BOURDIEU, 1983c, pp. 136-137). In other words, scientific capital is "the product of the recognition of competitors" (BOURDIEU, 2004b, p. 80).

> Scientific capital is a particular kind of symbolic capital (which, it is known, is always founded on acts of knowledge and recognition) that consists of the recognition (or credit) attributed by the set of peers-competitors within the scientific field (e.g., Citation Indexes are a good indicator, which can be improved, as I did when studying the French university field, taking into account the various forms of recognition and consecration, such as the Nobel prize or, on a national scale, the CNRS awards, or even translations into foreign languages). (BOURDIEU, 2004a, p. 26-27).

We acknowledge as legitimate the current questions among the scientific community about productivism, seen as an "academic expression of neoliberalism" (DUARTE; SANTOS; DUARTE, 2020, p. 1). However, we chose to apply this criterion as we understand that it minimally contemplates the specificity of each area (thus, it evaluates the volume and quality of productions differently), and represents an evaluation system with no direct implications for the labor relations of researchers. We also understand that the very criticism of this system depends on robust scientific analyses, as indicated by Bourdieu (2017, p. 35):

> [...] social science cannot break with common criteria and classifications and disentangle itself from the struggles of which they are both end and means, unless it takes them explicitly as its object instead of letting them slyly infiltrate scientific discourse. The milieu which it must Trudy is the object, and, to a certain extent at least, the product of rival, sometimes hostiles representations, which all claim the status of truth and thereby the right to exist.

In this sense, we turn to the profile of research scholarship recipients, hoping to identify the autonomy or heteronomy of the teaching area, based on the existence of more or less defined boundaries in this possible field. As many are the possibilities to investigate the field's autonomy, in this study, we focus on the rights to admission or admission requirements. According to Bourdieu (2004b, p. 74), "the admission requirement is competence, the embodied scientific capital". Thus, the specific capital not only constitutes and structures the field, but also its borders, which depend

> [...] above all, on the degree to which the scientific field is protected against intrusions (mainly through the higher or lower right of entry that it imposes on newcomers and which depends on the scientific capital collectively accumulated) and the degree to which it is able to impose positive or negative sanctions. (BOURDIEU, 2004a, p. 34-35).

Recently, a literature review carried out by Massi, Agostini and Nascimento (2021) found works in the area of science teaching that used the Bourdieusian concept of field. Feres (2010) analyzed PGPs in the subarea of science education as a scientific field, characterizing the interests and disputes between their agents. Ribeiro (2008) presented a historical study of the constitution of chemistry education and the conflicts between teaching and chemistry, using historical reconstruction of the creation of a licentiate degree in chemistry, showing the debates between political, scientific and educational fields. Pereira and Teixeira (2021) analyzed the intellectual production of researchers in the area of teaching from programs with grades between 6 and 7, identifying co-authorship strategies and topics explored by the agents.

Theoretical and methodological pathways

Bourdieu (1989, 2013) recognizes the methodological difficulty of articulating field theory, which was built "from generalization to generalization" (BOURDIEU, 1989, p. 69). To understand his theory, it is necessary to put into practice his praxiological way of thinking, which employs empirical and scientific theory to explain the interaction between the subject and society. Bourdieu (1996) highlights three basic and intrinsically linked pathways to operate the analysis of a field: i) position of this field in relation to the field of power; ii) identification of the field's internal structure, including the objective positions occupied by the agents; and iii) analysis of the genesis of the agents' *habitus*.

In this study, we prioritize the internal structure of the field, aiming to investigate whether the teaching area of Capes can be considered a scientific field. Accordingly, we need to discuss two research questions: 1) what is the distribution of scientific capital in the area of Teaching; and 2) what are the implications of this distribution on its constitution as a scientific field.

We understand that the "Research Productivity Grants" (RP Grants) [Bolsa de Produtividade em Pesquisa – PQ] offered by the Brazilian National Council for Scientific and Technological Development (CNPq) constitute scientific capital, and the scholarship recipients as the dominant agents, insofar as they occupy superior positions in the scientific field. This type of resource represents an important indicator of scientific capital, also because it is attributed by peers and competitors. In this sense, this study was carried out with a group of professors funded by CNPq, who are also advisors in PGPs in the teaching area of CAPES. Professors with RP Grants are considered to have the greatest scientific capital, and were classified according to the area of the Advisory Committee (AC) and the grade of the program in which they work.

Bourdieu (1988) assumes that it is methodologically more productive to analyze the poles of a field than the intermediate positions, i.e., agents who occupy the extreme positions of the field. Thus, we chose to consider the extreme poles of classification of the programs as: those that obtained a grade of 6 or 7 and those that received a grade of 3 according to the Sucupira platform of Capes in 2019. Therefore, agents who work at Capes' social spaces of PGPs in teaching are considered, respectively, in the nomenclature used by Bourdieu, as dominant and dominated. The intention is to relate the position of agents in the social space with the institutions in which they work, trying to understand whether they are in the dominant pole or in the dominated pole.

We intend to identify professors' profiles by crossing information about the area of the AC to which the professor belongs and the poles of classification of the programs, in order to investigate the internal structure of the teaching area by CAPES and the possibilities of this area to be considered a scientific field.

The scientific capital of the teaching staff

An initial analysis showed that only half of the professors with RP grants are from the area of education or related to teaching - unlike physics, for example, in which practically all scholarship holders are so in Physics or in a related area (NASCIMENTO; AGOSTINI; MASSI, 2022). This result reveals that the right to enter the teaching area is also guaranteed for specialists from other areas, which suggests lack of autonomy.

Capes data for 2019 reveal the presence of 4,027 teachers registered in programs in the teaching area. It is important to note that advisors may work in more than one program. Regarding the modality of the programs, 1,850 faculty advisers work in academic master's/academic doctoral (AM/AD) courses and 2,177 in professional master's/ professional doctoral (PM/PD) courses, reinforcing the known fact that there are more professional than academic courses in numerical terms. The distribution of professors in each modality according to the grade of the program in which they work is presented in Table 1. We note that most advisors work in programs rated 3 and 4, and a minority in courses '6' and '7'.

Table 1 – Percentage distribution of professors working in academic and professional modalities according to the rating of graduate programs in the teaching area

Rating	PM/PD	AM/AD
3	59%	35%
4	26%	32%
5	6%	16%
6	0	8%
7	0	1%
No classification	9%	8%

Source: Data extracted from The Sucupira Plataform, by Capes (2019).

After the general description of the professors working in the AM/AD and PM/PD modalities of the programs with the best and worst evaluation, we move on to the description of the agents in this group—who has more specific capital, be it related to teaching or other areas. In programs rated 3, out of 1,279 advisors, only 41 receive RP grants, which is over 3 percent. In those rated 6 and 7, there are 172 professors, of which 36 (21%) are RP recipients. The rate of grantees per professor in courses rated 6 and 7 is almost ten times higher than in those rated 3: a relation that deserves attention.

Using the list of RP recipients working in programs in the teaching area, we consulted on the CNPq website to assess the AC through which the professor joined the system. In the grade 3 programs, only 40 percent are recipients through an AC in education or similar areas; the vast majority receive a CNPq grant for their experience and work in other areas, such as physics, botany, speech therapy and nuclear engineering. On the flip side, seventy-two percent of the recipients are in education or a similar field in the programs with the best evaluation.

This cross-referencing allows for defining four profiles of professors working in the programs: two for the programs rated '6' or '7', and other two for the '3', which are described below. It is important to highlight that, as Bourdieu (2017) suggests, the profiles represent "constructed individuals", defined by a set of analyzed properties that refer to archetypical profiles, and not empirical individuals.

• Type A profile: Research Productivity Grant Recipient (funded by CNPq) from an AC in education. Extensive experience in the area and recognized production of teaching articles. Editorial work in educational journals and participation in associations or events in the area. Often remains in the institution and in the program rated 6 or 7. Works with AM/AD students. This profile is very common among recipients working in these programs;

• Type B profile: Research Productivity Grant Recipient (funded by CNPq) from other areas than education, such as physics, aerospace engineering, botany, medicine, nuclear engineering, nursing, psychology, microbiology, scientific dissemination, and speech therapy. Extensive experience in the original area, but has production in teaching. In general, remains in the institution and in the programs rated 6 or 7. Works in AM/AD courses. This profile is associated with a minority of recipients who work in these programs;

• Type C profile: Research Productivity Grant Recipient (funded by CNPq) from other areas, such as physics, aerospace engineering, botany, medicine, nuclear engineering, nursing, psychology, microbiology, scientific dissemination, speech therapy. Extensive experience in the area of origin and little to no production in education or teaching. In general, remains in the institution, being able to work either as a collaborator or employee in the program rated 3. Works in PM/PD courses. This profile is very common among recipients working in these programs; and e

• Type D profile: Research Productivity Grant Recipient (funded by CNPq) from education or similar area. Extensive experience in the area and recognized production in teaching. Editorial work in education journals and participation in associations or events in the area. In general, works is a collaborator in the institution and in the grade 3 program. Works in both AM/AD and PM/PD courses. This profile is associated with the minority of recipients in these programs.

Teachers' scientific capital and the issue of borders in the teaching area

Type A profiles can be considered the model of a researcher with high scientific capital within a field. It is possible to identify in this group some of the indicators of scientific capital, proposed by Bourdieu (2017) when analyzing the French academic field. Although these must be rethought in the current national context, they still indicate forms of distinction and notoriety arising from different forms of capital, as Massi, Carvalho and Giordan (2020, p. 424) point out):

> a) the determinants of the chances of access to occupied positions (education, family economic capital, cultural capital, geographic origin); b) school determinants (institutional school capital); c) university capital and power (belonging to certain positions and management positions); d) capital of scientific power (direction of scientific associations, funding agencies, etc.); e) the capital of scientific prestige (scientific distinctions, citation indexes); f) capital of intellectual notoriety (belonging to scientific academies, mentions and appearances in the media, collection organizations and scientific journals); g) capital of political or economic power (occupation of ministerial political positions, government commissions, etc.); h) political provisions (signing of petitions and attending specific colloquia).

In parallel to physics, virtually all RP recipient who work as advisors in their programs have a type A profile. It is very difficult for professors of different profiles to enter well-established fields; therefore, in the case of the teaching area, the type A profile can be considered a typical ideal of a researcher who will occupy the top of the academic hierarchy in the area, for having specific capital in teaching.

The type B profile includes those researchers who stand out in another field, but then effectively start to work with teaching, developing research and assisting in the training of human resources. Despite receiving a RP grant and occupying outstanding positions, with consolidated trajectories in other fields, professionals with this type are not at the same place as those ranked A in terms of social space of education, since they are still starting a trajectory in this area. Due to the volume of production of articles and guidelines in the teaching area, we can consider that this group occupies a position in the hierarchy of the area similar to that of newly graduated doctors (<10years)

Type C profile includes those researchers who are also experts in other areas; however, unlike type B, they are not productively bringing or converting specific capital from the field of origin into the area of teaching, i.e., producing knowledge in a research area in education. The fact that they are concentrated in professional master's and doctoral courses indicates that they work in development projects, not research. Unlike types A and B, this profile cannot be found in most autonomous fields. For example, an RP recipient in education would hardly become an advisor in well-established PGPs, such as physics. This would only occur when the researcher presented a series of minimum requirements to ensure their right of entry, which is the case of type B profiles. If they did not meet these basic requirements, which is precisely the case of type C, they cannot become an advisor in physics.

However, a type C researcher is accepted in the teaching area, and today we have more researchers with this type advising in the teaching area than any other. Through Bourdieusian theory, we discussed how difficult and rare it is to join disputes over spaces where one does not have the specific "competence", which apparently is not a barrier in teaching. Bourdieu (1983c) allows for thinking that these profiles, which are currently the majority, were initially infiltrated as "Trojan horses" in the area. since they introduced their specific scientific capital from other fields of productivity within the grants system, recognized as one of the most legitimate positions by researchers. By occupying positions of intellectual notoriety in another area, it is possible to suppose that their presence in the teaching area is accompanied by a deviation of research in this area, towards their specific disciplinary fields, which contributes to the absence of a specific teaching capital, the possible inexistence of borders, and an obstacle when it comes to constituting a scientific field.

Type D professors are similar to those with a type A profile—some of which can be associated with both profiles, since the main difference lies in the fact that type D implies acting as a collaborator in the institution or program. Apparently, some type A professors are invited to work in newly created programs, in order to collaborate in some way with the course that is in process of institutionalization. In practical terms, types A and D occupy the same position in the hierarchy of the area.

We can infer that these positions have a direct impact on the dispute about what constitutes the area and what are its specific objects and methodologies, since they refer to its capital and scientific habitus, and the fact that are the agents who configure the field. Bourdieu (2004a, p. 126) describes that

> It is the scientific field—a place of political struggle for scientific domination—that, based on the position each researcher occupies, assigns them their problems, inseparably political and scientific, and methods, scientific strategies that, defined expressly or objectively in reference to the system of political and scientific positions constituting the scientific field, are at the same time political strategies.

Bourdieu (2004b, p. 62) also states that “a scientist is the scientific field made person, whose cognitive structures are homologous to the structures of the field”. Therefore, we ask ourselves: how could cognitive structures that make up the type C profile, corresponding to areas so diverse and not directly related to Teaching or similar area, shape teaching as a scientific field? How is it possible to structure a scientific field where the dominant agents with profile C, who own the largest volumes of capital, have specific capital from other fields? What would be the nomos of the field of teaching, irreducible to another discipline, given this profusion of areas involved with type C dominants that do not relate to teaching or a similar area? On the contrary, types A and D could represent a path towards the definition of a nomos in the area of education that could consolidate its specific concern with teaching. Type B represents this effort to bring the researcher’s cognitive structures closer to the new area of activity, in addition to contributing to the formation of this nomos.

In the next section, we discuss the implications of these results for the current scenario in the teaching area, and point out the issues that this structure may pose for research in teaching.

Discussion and implications

The analysis of the scientific capital of professors who work in the teaching area revealed that this area is not structured as a scientific field. Unlike what happens in well-established fields, the plethora of profiles among most of advisors in programs in the teaching area corresponds to a diversity of cognitive structures, since the agents come from many different scientific areas. Our results also show aspects of the symbolic struggle for recognition of what is legitimate in the area of teaching, pointing to the low adherence to its nomos, since the majority profile is characterized by professors who do not intend to convert their specific capital to this area. This result explains the low autonomy of a possible field, since most researchers do not consider specific intellectual production in the teaching area as scientific capital.

As briefly presented above, the sociogenesis of the teaching area shows that the changes to Area 46 that took place in 2011 pushed the entire area closer to professional master’s programs. Before its extinction, between 2002 and 2011, Area 46 saw a significant increase in the number of professional master’s courses from institutions without academic tradition or properly trained/experienced advisors in the area of teaching, which marked the beginning of the hegemony of teaching in relation to research. The former area of science and mathematics teaching, largely formed by teachers with the type A profile and in a process of consolidation at that time, found itself uncharacterized.

In this context, the policy that implemented professional master's programs on a national level in 2012, such as the national professional master's degree in teaching of mathematics or physics by the Brazilian Society of Physics, is another important element to be analyzed to understand the recent history of the teaching area. These courses, despite not being allocated in the teaching area5, come to corroborate the status of postgraduation and the professors' profiles that were expected with the changes in the teaching area.

The creation of the postgraduate professional modality can be attributed to the influence of neoliberal educational policies proposed by international organizations (such as the Organization for Economic Cooperation and Development and the World Bank) for peripheral countries, aiming at adapting education to the requirements of the world market and the new stage of internationalization of capitalism. In this agenda, content knowledge is privileged, which is considered more important for students' performance than the teacher's pedagogical knowledge (REZENDE; OSTERMANN, 2015). These guidelines are in line with the emphasis on specific knowledge observed in the guidelines of professional master's courses in the area of Science and Mathematics Teaching since their creation, as well as in online courses.

The primacy of professional programs in the area of education is the pinnacle of the objectives intended in their creation, to the point that, in the Area Document from 2019, the boundaries between academic and professional courses are very tenuous:

> The teaching area strongly encourages interaction, mainly with basic education, considering that the objective of the area is the qualification of research aimed at a better overall education in the country. In this sense, academic master's and doctoral courses have the function of training researchers with a view to producing knowledge about teaching, which contribute to its better understanding and to problem-solving in Brazilian educational reality. On the other hand, professional master's and doctorate programs train researchers, whose research focuses on practices, processes and products, which can be disseminated to Brazilian schools, in order to improve teaching in the country. In both cases, basic education schools are considered spaces for training and producing knowledge, as well as spaces in which research results can and should be disseminated through interaction with institutions that maintain graduate programs with the purpose of improving teacher training and, consequently, teaching itself. (CAPES, 2019, p. 16-17).

Thus, if, according to Capes (2019), the production of knowledge of academic courses should focus on "problem-solving in Brazilian educational reality", and if professional courses should disseminate "practices, processes and products [...] in order to qualify the teaching in the country", it is possible to see a clear approximation between the objectives of the two modalities, given by the same utilitarian and applicationist vision of knowledge. Although it might seem fragmented, this educational vision, which is rather widespread throughout the teaching area, came to be the amalgam of homogenization in this area.

5- The former is registered in the area of Mathematics/Probability and Statistics, and the latter in the area of Astronomy/Physics.

Also fragmented by the creation of the teaching area, Science Education is today one of those subgroups that intend to give sense to research and development within this area. The academic excellence of this subgroup, reinforced by the expressive presence of advisors with a PQ grant from CNPq and aligned with education or a similar area, characteristic of profile A, may explain the quality of the programs in which they work.

Assuming that the ongoing disputes between dominant and dominated among subgroups of professors can generate new conformations in the field, a possible configuration could be the stabilization of the subgroup of professors of profile A and its constitution as a scientific field, insofar as its agents have become increasingly more aware that their cognitive structure and ideals of education and research are different from what was intended when CAPES fostered homogenization with the creation of a teaching area.

We anticipate that this study will assist agents in the field of teaching, as it provides a succinct view of the distribution of scientific capital within the field and shows training aspects of teacher education. We hope our findings can be used as a reference for critical reflection on the configuration of the field of teaching, which is still being driven by its agents.

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