

**COMMUNITIES OF PRACTICE AND TEACHER FORMATION: A LOOK
TOWARDS RESEARCH IN BRAZIL**

**COMUNIDADES DE PRÁTICA E A FORMAÇÃO DE PROFESSORES: UM OLHAR
PARA AS PESQUISAS NO BRASIL**

**COMUNIDADES DE PRÁCTICA Y FORMACIÓN DOCENTE: UNA MIRADA A LA
INVESTIGACIÓN EN BRASIL**



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ABSTRACT: This study seeks to map Brazilian research about Communities of Practice (CoP) involving teachers in the last two decades. For this, I developed a state-of-the-art publication in the Portal of Journals from CAPES, utilizing the descriptor ‘Communities of Practice’ combined with six other descriptors. Through content analysis, it constituted a corpus of 33 articles. As a result, the predominance of studies in the fields of mathematics and languages and the tendency for authorship from the south and southeast regions were identified. Also, it was perceived that CoP contributed to the professional identity, development of knowledge and specific activities, alliance with technologies, and constitution of new CoP. It is inferred that CoPs are still understudied in the Science Education area in Brazil; however, when explored, it results in a powerful qualification of the teacher praxis in the interaction with the collective and in personal growth.

KEYWORDS: Community of Practice. Teacher formation. Collective work. State of art.

RESUMO: Nesta pesquisa, objetiva-se mapear os estudos, no Brasil, nas últimas duas décadas, acerca de Comunidades de Prática (CoP) envolvendo professores. Para tal, construiu-se um estado da arte das publicações do Portal de Periódicos da CAPES, utilizando como descritor, “Comunidades de Prática” combinado com outros seis descritores. Por meio da análise de conteúdo, constituiu-se um corpus de 33 artigos. Como resultado, foi identificado a predominância de estudos nas áreas da Matemática e das Linguagens, mais concentrados nas regiões Sul e Sudeste do país. Ainda, identifica-se as CoP na contribuição para a identidade profissional, no desenvolvimento de conhecimentos e atividades específicas, na aliança com tecnologias. Infere-se que as Comunidades de Prática ainda são pouco estudadas nas áreas de Educação em Ciências no Brasil, porém, quando exploradas, resultam em uma potente qualificação da práxis docente, no convívio com o coletivo e no crescimento como ser humano.

PALAVRAS-CHAVE: Comunidade de Prática. Formação de professores. Trabalho coletivo. Estado da arte.

RESUMEN: En esta investigación, el objetivo es mapear estudios en Brasil sobre Comunidades de Práctica (CoP) que involucran docentes, de las últimas dos décadas. Para ello, se elaboró un estado del arte de las publicaciones en el Portal de Revistas de la CAPES, utilizando como descriptor “Comunidades de Práctica” combinado con otros seis descriptores. A través del análisis de contenido se creó un corpus de 33 artículos. Como resultado, se identificó un predominio de estudios en las áreas de Matemáticas y Literatura, así como en las regiones Sur y Sudeste de Brasil. Aun así, nos vemos como CoP en los siguientes aspectos: contribución a la identidad profesional, desarrollo de conocimiento y actividades específicas, alianza con tecnologías, creación de una nueva CoP. Se infiere que las CoP aún son poco estudiadas en las áreas de la Educación Científica en Brasil, sin embargo, cuando son exploradas, resultan en una poderosa calificación de la praxis docente, la convivencia con el colectivo y el crecimiento como ser humano.

PALABRAS CLAVE: Comunidad de Práctica. Formación de profesores. Trabajo colectivo. Estado del arte.

Introduction

Community of Practice, a term originating in the 1990s, refers to a group of individuals who interact based on a common theme/interest, with the purpose of acquiring individual and collective learning through social relationships, a sense of belonging and identity, mutual engagement, joint enterprise, and shared repertoire (WILBERT; DANDOLINI; STEIL, 2018). Thus, it is "composed of a conceptual framework that reflects on learning in its social dimension" (PAULINO, 2011, p. 25, our translation).

Communities of Practice (CoPs) are identified as relevant sites for the creation and maintenance of knowledge, considered by Cavalcanti, Gomes, and Pereira (2001) as "intellectual workshops," in which a group of people seeks, as best as possible, to learn more, solve doubts, and address problems. Davenport and Prusak (1998) further describe them as strategies aimed at fostering creativity, improving skills, and generating innovations.

The term may be recent, but the notion of working together or in teams is as old as the earliest hominids who lived in social communities, sheltering together and gathering to (re)formulate hunting strategies, create tools, or discuss which roots were edible (WENGER; MCDERMOTT; SNYDER, 2002). These are habits that, by bringing benefits and advantages, persist to this day and reach various aspects of life. In this sense, all of us, in some way, have belonged to and experienced collective, communal, and collaborative experiences close to a CoP, or even a CoP itself, whether in the workplace, at school, at home, or in our leisure time (WENGER, 1998; 2010).

That said, with over 30 years since its inception as a concept, CoPs have a broad presence in research in Brazil in various areas, such as health, education, organizational management, knowledge management, and sociology. In the educational sphere, CoPs appear through themes: contributions to the construction of professional identity (PAMPLONA; CARVALHO, 2009; RAMOS; MANRIQUE, 2015), a place for the development of knowledge and activities, such as planning, classes, and experiences (AZEVEDO; PUGGIAN; FRIEDMANN, 2013), among others. The concept has proven to be a pertinent tool for studies and research related to various fields, including teacher training (RAMOS; MANRIQUE, 2015).

In Education, the concern for improvement to achieve higher quality in public education through teacher training has gained prominence in the last 20 years (GATTI, 2010), whether in initial training, continuing education, or even in Basic Education schools. Teaching is

considered complex, reflective, and constant work, with a movement of demands and aspirations in the improvement of "being a teacher". Therefore, it is essential to have individual, experiential, and collective competencies, in which "the knowledge produced by and in collective work is unique both in content and form, because they develop from a wealth of experiences of individuals (content) and in relationships with the group (form)" (COSTA; VARANI, 2017, p. 54, our translation).

This exchange of experiences and sharing of knowledge aid mutual formation in which, at the same time that the teacher educates, they also educate themselves. Thus, it is indispensable "[...] to give a prominent place to the creation of group work and debate spaces, which allow the articulation between personal experiences and shared experiences" (ESTEVEZ, 2010, p. 52, our translation).

In this aspect, several studies discuss the relevance of collective work among teachers. According to Chalhah (2010) and Cunha, Ometto, and Prado (2013), this type of service leads to privileged opportunities for reflection on school routine, as well as the creation of partnerships aimed at improving teaching and learning processes. Through interaction and shared reflection in groups, teachers are able to problematize social and political aspects of teaching, considering their classroom practices, both regarding students and their working conditions (ZEICHNER, 1993). Therefore, it brings with it the

[...] moral support, which helps overcome failures, increased efficiency, which allows for the breaking of redundancies in teamwork, improved effectiveness, the sharing of ideas, experiences, and responsibilities, leading the teacher to be more efficient, reduced workload, sharing of ideas and circumstances reducing excess work and increasing creativity; situated certainty, teamwork reduces insecurity, increased reflection capacity enables reflection and promotes dialogue on curriculum practices, improving them, learning opportunities provide teachers with mutual learning, and continuous improvement, collaboration encourages teachers to view change as a process of constant improvement in which they can find answers to diagnosed problems (HARGREAVES 1998 apud CARVALHO, 2018, p. 41, our translation).

What gives meaning to training is the dialogue between teachers, the rigorous analysis of practices, and the **collective** search for the best ways to act (NÓVOA, 2011, p. 72, author's emphasis, our translation). Therefore, "as an individual progresses in a Community of Practice, learning happens, and the individual is constructed" (AZEVEDO, 2016, p. 71, our translation).

Thus, the focus of this writing will be on environments related to teacher training, attempting to answer the following questions: Are there studies addressing Communities of

Practice related to teachers? If yes, how do they appear? To do so, studies on Communities of Practice among teachers in the last two decades in Brazil were mapped through a state-of-the-art review of publications in the Periodicals Portal of the Coordination for the Improvement of Higher Education Personnel (CAPES), using the descriptor "Communities of Practice" combined with six other descriptors (teacher training, teaching practice, teaching activity, teaching work, and teacher training).

Methodological Approach

In order to investigate how Communities of Practice related to teachers have emerged in the Brazilian context in recent years, quantitative-qualitative research was conducted, considered a State of the Art. Furthermore, an analysis was carried out systematically on the temporal distribution, publication locus, author affiliation, and how CoPs are employed.

The State of the Art consists of "inventorying, systematizing, and evaluating scientific production in a specific area (or theme) of knowledge, seeking to identify trends and describe the state of knowledge of an area or a study theme" (FIORENTINI; LORENZATO, 2006, p. 103, our translation). Research of this type aims to "recognize and identify the main results of investigations carried out in the investigated area, the main thematic trends as well as the dominant and emerging approaches" (VIOL; MISKULIN, 2014, p. 511, our translation). This research effort allows the researcher to understand the historical development of a particular subject, illuminate key aspects in the construction of the research object, as well as uncover still unexplored gaps.

It is essential to highlight some necessary precautions in choosing this study method, in order not to confuse it with other methodologies, especially those of a bibliographical nature. It is crucial to analyze the most appropriate time frame and relevant research databases. It is also necessary to consider the research stages and establish clear criteria for selecting the material that will constitute the body of the study. These steps are essential to ensure the validity and reliability of the results obtained.

Thus, the aspects systematized by Romanowski and Ens (2006) were adopted for this stage: 1) definition of the time frame and descriptors for searches; 2) definition of the indexing platform(s); 3) definition of criteria for material selection; 4) survey and systematization of materials, and 5) reading and organization of materials. Subsequently, in October 2021, a survey of publications was conducted on the Periodicals Portal of the Coordination for the

Improvement of Higher Education Personnel (CAPES) on a computer connected to the Internet network of a public university. It is emphasized that this platform was chosen because it is the Brazilian government's public policy to provide free access to national and international scientific information.

As descriptors, the term "Communities of Practice" was used in combination with the descriptors "Teacher Training," "Teaching Practice," "Teaching Activity," "Teaching Work," and "Teacher Training" for the last 20 years (a period in which open digital scientific publications became common in Brazil). For this purpose, the following quantitative results were obtained:

- Community of Practice + Teacher Training: 66 productions;
- Community of Practice + Teaching Exercise: 6 productions;
- Community of Practice + Teaching Practice: 63 productions;
- Community of Practice + Teaching Activity: 24 productions;
- Community of Practice + Teaching Work: 29 productions;
- Community of Practice + Teacher Training: 132 productions.

For the analysis of the found works, the methodology of Bardin (2011) was used, following the following steps: a) Pre-analysis: "floating" reading of the texts, in which the research is sought to be known, initial ideas are organized, and hypotheses are (re)formulated, also the elaboration of essential indicators for the discussion of the results is carried out; b) Coding: grouping of the raw data of the article, which provides the description and detailing of the research; c) Categorization: space for differentiation and regrouping of characteristics common to previously established criteria; d) Inference: interpretation of the results found, and e) Computerization: use of resources (programs, platforms, and software) for organization and analysis. Thus, the articles were analyzed by the following categories, defined a priori: (i) Year of publication; (ii) Place of publication; (iii) Institutional affiliation of the authors (iv) How CoP is employed in the study.

Results and discussions

Following the steps of the methodology mentioned above, a total of 320 articles were identified. After an initial reading of the complete works, duplicate articles and/or those that presented the descriptors only in the references were excluded, as well as those that referred to Communities of Practice (CoP) only with Higher Education teachers (without relation to undergraduate or graduate students of Basic Education) and/or formed outside Brazil. At the end of this process, 33 articles that directly related to the mentioned descriptors were selected. These works are presented in chronological order in Table 1.

Table 1 - Articles indexed in the CAPES periodical portal that relate CoP with teachers (chronological order)

No.	Year	Journal	Authors' Affiliation	Title
1	2009	<i>Bolema</i>	UFMT UNICAMP	<i>O Ensino de Estatística na Licenciatura em Matemática: a inserção do licenciando na comunidade de prática dos professores de Matemática</i>
2	2010	<i>Bolema</i>	UNESP	<i>Uma Caracterização do Centro de Educação Matemática – CEM (1984–1997) como uma Comunidade de Prática de Formação Continuada de Professores de Matemática</i>
3	2011	<i>Ciência & Educação</i>	UFBA Universidade de Burgos	<i>Participação em uma comunidade virtual de prática desenhada como meio de diminuir a lacuna pesquisa-prática na educação em Biologia</i>
4	2013	<i>Tear: Revista de Educação Ciência e Tecnologia</i>	UFRGS	<i>História da matemática & tecnologias da informação e comunicação: uma experiência semipresencial cooperativa na formação de professores</i>
5	2014	<i>Revista da FAEEBA</i>	UEL	<i>Aprendizagens de professoras que ensinam Matemática em uma Comunidade de Prática</i>
6	2014	<i>Educar em Revista</i>	UFPR	<i>A utilização das TIC nos processos de formação continuada e o envolvimento dos professores em Comunidades de Prática</i>
7	2015	<i>Ilha do Desterro</i>	UFRGS FURG	<i>Inglês sem fronteiras: uma mirada ao contexto de prática pelo prisma da formação de professores</i>
8	2015	<i>ScientiaTec</i>	IFRS	<i>Comunidades de Prática docente: uma alternativa para a formação continuada de professores</i>
9	2015	<i>Química Nova</i>	USP	<i>A formação de professores em Comunidades de Prática: o caso de um grupo de professores de química em formação inicial</i>
10	2015	<i>Bolema</i>	PUCSP	<i>Comunidade de Prática de Professores que Ensinam Matemática como Espaço de Negociações de Significados sobre a Resolução de Problemas</i>
11	2016	<i>Revista Ibero-Americana de Estudos em Educação</i>	UFSCar	<i>Comunidade de prática no ensino superior</i>

12	2016	<i>Jornal Internacional de Estudos em Educação Matemática</i>	UFPR UEL	<i>Desenvolvimento Profissional de Professores em Educação Estatística</i>
13	2016	<i>Educação Matemática Pesquisa</i>	UEL	<i>Comunidades de Prática como contexto para o desenvolvimento profissional docente em Educação Estatística</i>
14	2016	<i>Revista da Faculdade de Letras da Universidade do Porto</i>	Universidade do Porto	<i>Narrativas acerca da formação de professores de Educação Física em contexto de prática supervisionada</i>
15	2016	<i>Bolema</i>	UEL	<i>Mathematics Teachers' Professional Identity Development in Communities of Practice: Reifications of Proportional Reasoning Teaching</i>
16	2017	<i>Educação Matemática Pesquisa</i>	UEL	<i>Ações da formadora e a dinâmica de uma comunidade de prática na constituição/mobilização de TPACK</i>
17	2017	<i>Revista Portuguesa de Educação</i>	Universidade do Porto	<i>O valor formativo das Comunidades de Prática na construção da identidade profissional</i>
18	2018	<i>Educação</i>	UERJ	<i>Parceria entre universidade e escola básica: formando uma comunidade de prática?</i>
19	2018	<i>Revista @ambienteeducação</i>	Faculdade Sumaré PUC-SP	<i>Aprendizagem da Docência: investigando a participação de duas estudantes de Pedagogia em uma Comunidade de Prática</i>
20	2018	<i>Educação Matemática Pesquisa</i>	UEL Universidade de Lisboa	<i>Análise de tarefas cognitivamente desafiadoras em um processo de formação de professores de Matemática</i>
21	2019	<i>EccoS – Revista Científica</i>	USP PUC-SP CPS	<i>Educação Profissional e Formação Docente: um estudo sobre comunidades de prática</i>
22	2019	<i>Revista Mundi Sociais e Humanidades</i>	IFC IFPR	<i>Comunidades de Prática: a prática educacional na prática</i>
23	2019	<i>Revista Ibero-Americana de Estudos em Educação</i>	UnB	<i>Comunidades de práticas como espaços de formação inicial na educação de jovens e adultos</i>
24	2019	<i>Calidoscópio</i>	Framingham State University	<i>A Formação no Seminário do Programa de Português para Estrangeiros da Universidade Federal do Rio Grande do Sul: uma modalidade híbrida de aprendizagem do professor-autor</i>
25	2019	<i>Educação Matemática Pesquisa</i>	UFOP PUCSP	<i>Sou professora de Matemática tradicional! Análise de traços de identidade de Amanda em relação à constituição profissional</i>
26	2019	<i>Revista Thema</i>	IFRSul PUCRS	<i>A estruturação de subprojetos de Química do PIBID na forma de uma Comunidade de Prática: vivências desse modo de formação de professores no Rio Grande do Sul</i>
27	2019	<i>Alexandria</i>	UEL	<i>Condicionantes de aprendizagens de professores que ensinam matemática em contextos de Comunidade de Prática</i>
28	2019	<i>Caderno Brasileiro de Ensino de Física</i>	UFRGS	<i>Recursos Educacionais Abertos para o Ensino de Física: um curso de extensão para licenciandos brasileiros e colombianos</i>
29	2019	<i>Educação Matemática Pesquisa</i>	UEL UNESPAR-PR	<i>Ações de uma formadora no desenvolvimento da agência profissional de professoras em uma Comunidade de Prática</i>
30	2019	<i>Revista Linguagem & Ensino</i>	Framingham State University UFRGS	<i>A interlocução com os pares na formação profissional e a construção da identidade do professor-autor-formador</i>

31	2020	<i>Revista da FAEEBA</i>	PUC-PR UP	<i>Aprendizagem da docência para a Educação Básica em Comunidades de Prática</i>
32	2020	Research, Society and Development	UFSC UFS	<i>Aprender o ofício acadêmico: impressões etnográficas sobre espaços de formação profissional no Ensino Superior</i>
33	2020	<i>Revista Brasileira de Pesquisa em Educação em Ciências</i>	UFPI USP	<i>A Formação de Comunidades de Prática no Ensino de Física: Uma Análise a Partir de Grupos de Estudo de Aula</i>

Source: Authors (2021).

Initially, analyzing the second column of Table 1, which is dedicated to the publication years of these journals, it is noted that the first work appeared only in 2009. A change in the landscape begins to unfold in the years 2014, 2015, and 2016, when there is a slight growth in publications on this topic, with two, four, and five selected articles, respectively. In the following years, the number of publications was 2 articles in 2017 and three articles in 2018. The volume of productions reached a new record in 2019, with 10 articles indexed on the platform. However, the quantity did not remain in 2020, and it was reduced to three articles.

Upon closer examination of the year 2019, it can be noted that the conceptualization of CoP related to teacher training has begun to become significant in Brazilian research. However, it is emphasized that, due to the data collection date, some more recent editions of publications might still not be available on the CAPES Periodicals Portal.

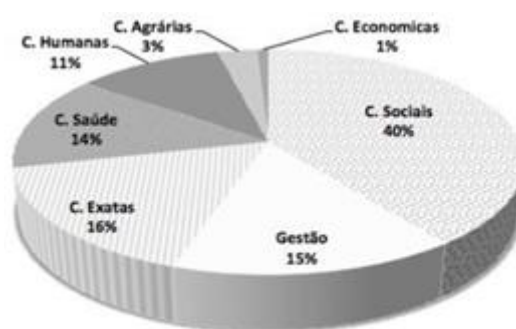
This increase from the years 2015/2016 is also found by Rodrigues, Silva, and Miskulin (2017), in their survey of dissertations and theses in the CAPES Bank of the Brazilian Digital Library of Theses and Dissertations (BDTD) and by Wilbert, Dandolini, and Steil (2018) in the mapping of articles and journals within this theme of Communities of Practice. Moreover, despite the existence of other surveys on CoP related to Education, on various platforms, and with various descriptors linking them, no justification was found for the increase in publications in these years.

In the third column, which concerns the publication venue of the analyzed articles, a predominance of publications in the journals *Educação Matemática Pesquisa: Revista do Programa de Estudos Pós-Graduados em Educação Matemática* (five articles) and *Bolema - Boletim de Educação Matemática* (four articles) was identified. Regarding the areas of knowledge (disciplinary components), it can also be concluded that there is a greater academic production in the area of Mathematics Education, totaling 13 out of the 33 articles (or approximately 40%). CoPs constituted by members from various areas and different levels of education (here titled multidisciplinary) are integrated into 6 articles of this sample. Following that, we have Pedagogy and Languages areas with three articles each, followed by two articles

in the areas of Social Sciences and Humanities, Physics, and Chemistry. Finally, we have the areas of Biology and Physical Education with only one article.

Regarding this, it is observed that areas such as Natural Sciences, Health, and Human Sciences still timidly explore this research field. On the other hand, studies of CoPs in the area of organizational management, conducted by Wilbert, Dandolini, and Steil (2018), demonstrate a considerable percentage in these fields of knowledge, as shown in Figure 1.

Figure 1 - Distribution of CoP research in the area of organizational management



Source: Wilbert, Dandolini, and Steil (2018)

These data reinforce the perception of an existing difficulty in forming interdisciplinary and/or transdisciplinary groups in the field of Natural Sciences. Despite this, it is emphasized how crucial these levels of integration are, as they can complement the disciplinary approach when developed in school environments and teacher training, leading to

[...] the emergence of new data from the confrontation of the disciplines that articulate them with each other; it offers us a new vision of Nature and Reality. Transdisciplinarity does not seek the mastery of various disciplines, but the opening of all disciplines to what unites and surpasses them. [...] The transdisciplinary vision is resolutely open in that it goes beyond the field of exact sciences due to its dialogue and reconciliation, not only with the human sciences, but also with art, literature, poetry, and inner experience [...] (NICOLESCU *et al.*, 2000, p. 168-169, our translation).

In the fourth column, regarding the geographical distribution of the main authors' affiliation of articles involving CoPs, there is a predominance in the South and Southeast regions, totaling 10 articles from faculties and universities in Paraná, 6 in the state of São Paulo, 5 in Rio Grande do Sul, 2 in Santa Catarina, and 1 each in the states of Rio de Janeiro and Minas Gerais. With a noticeable difference in the number of publications, there are 3 articles in the

Midwest region and 1 in the Northeast region. Also noted are the 4 articles authored by individuals affiliated with international institutions, namely Portugal and the United States of America. Thus, the only Brazilian region not covered by publications related to Communities of Practice is the Northern region.

Compared to the study conducted by Rodrigues, Silva, and Miskulin (2017), it is possible to infer a similarity in the results, as the authors identified that individuals from the South and Southeast regions authored 43 out of the 46 selected researches. This brings an essential consideration to this research, as it reaffirms the regions that have groups dedicated to Communities of Practice related to teaching practice.

Finally, from these published works, in different areas, places, and years, an attempt was made to understand the role that CoP played in each of them. For this purpose, Bardin's analysis (2011) was used with the following guiding questions: What is the object of study of these productions? What do they investigate?

Four categories emerged, listed in Table 5: "Importance of CoP in contributing to professional identity," "CoP as a space for the development of specific knowledge and activities," "Technologies allied with CoP," and "Potential establishment of a new CoP." It is worth noting that in some works, the framing of the CoP objective fell into more than one category, as there are overlaps, with the boundaries between categories being subtle and gradual. It is acknowledged that limitations arise when establishing categories, nevertheless, it is essential to have them as a way of systematizing what is found in the research, as well as a means to search for patterns, trends, movements, potentialities, etc.

Table 2 - Categories of the role of CoP employed in articles indexed in the CAPES journal portal from 2001 to 2021

Categories	Total articles	Categorized articles
Importance of CoP in contributing to professional identity	23	1, 2, 5, 7, 9, 10, 12, 13, 14, 15, 17, 19, 21, 23, 24, 25, 26, 27, 29, 30, 31, 32 and 32
CoP as a space for the development of specific knowledge and activities	15	3, 5, 8, 9, 10, 12, 13, 15, 16, 18, 19, 20, 22, 28 and 29
Technologies allied with CoP	4	4, 6, 8 and 16
Potential establishment of a new CoP	5	11, 18, 28, 32 and 33

Source: Authors, 2021

In the first category, titled "*Importância da CoP quanto à contribuição para a identidade profissional*", 23 of the analyzed articles are present. In it, CoPs aim to identify and

analyze aggregating elements for professional development, whether in initial or continuing teacher education. For example, there is the work of Douglas Tinti and Ana Lúcia Manrique (2019, p. 1, our translation), which "analyzes the professional constitution and understanding of teaching and learning processes of a Mathematics teacher, named Amanda, member of a Community of Practice – CoP, constituted in one of the OBEDUC projects." There is also the article by Inês Cardoso, Paulo Batista, and Amândio Graça (2016, p. 1, our translation), which aims to "capture the internal perspective of a cooperating teacher on the dynamics of the community of practice in the reconstruction of the professional identity of three Physical Education trainees."

Regarding the teacher's identity, one must consider its fluidity, instability, and evolution, which are strongly influenced by sociocultural contexts and the working environment. Therefore, the (re)construction of the teacher's identity is a dynamic process, with numerous (re)interpretations. An example of this is presented in the article by Alves, Queiros, and Batista (2017, p. 170, our translation), where different knowledge agents work together "toward a common goal, negotiate meanings, interact continuously, produce, and share new knowledge that, ultimately, will lead to the (re)construction of the Teacher's Identity."

In the second category, with 15 results, are researches related to "*CoP como espaço para o desenvolvimento de conhecimentos e atividades específicas*", including articles that address CoP as a space for creation, making, and planning activities aimed at improving praxis in the classroom. As an example of this category, there is the work of Douglas de Souza, Elkin Vera Rey, and Ives Araujo (2019, p. 795, our translation), which portrays a congregation "of Colombian and Brazilian Physics undergraduates, seeking to favor the eventual emergence of a Community of Practice interested in the development of Open Educational Practices in Physics Teaching."

In this CoP, formed for teacher education, members discuss and reflect on their knowledge, build trusting relationships, and, in this process, develop activities to assist and complement their praxis in the classroom. "The purpose of establishing a CoP for teacher education is to break with the model of training courses in which content and management are predetermined by the trainer or training institution" (CYRINO; BALDINI, 2017), thus making the knowledge-building process dynamic, flexible, and collective.

Comprising the category "*As Tecnologias aliadas a CoP*", four articles were found that describe and demonstrate the use of Digital Technologies or Networked Educational Technologies as important foundations for forming a CoP composed of teachers and teacher

candidates. To illustrate this category, there is the work of Glauco Gomes de Menezes (2014, p. 283, our translation), which "discusses the use of Information and Communication Technologies (ICT) and raises contemporary concerns about the role of the basic education teacher as a producer of knowledge," presenting relationships with their participation in the CoP.

The use of technologies enables the formation and maintenance of communities, both in formal and physical spaces such as schools and universities, as well as in digital and online environments like Moodle and Google Classroom. In the case of the digital world of CoPs, "there are distinct tools such as forums, social media, Moodle, among other platforms that enable interaction and sharing of information and materials among members" (CORAZZA *et al.*, 2017, p. 477, our translation). In light of this, the authors emphasize that:

Establishing a virtual community has its potentialities, one of which is the ability to optimize the relationship between space and time, since the internet can be accessed from all points of the globe, facilitating communication between people from different regions and countries. [...] However, we must not overlook that the virtual environment has its limitations, as part of the synesthesia of interpersonal contact is lost amidst platforms. For this, it is necessary to recognize that through the internet, it is only possible to reach an extension of the relationships established physically, in other words, an extension of the real world, and not an exclusive means for such connections (CORAZZA *et al.*, 2017, p. 477, our translation).

Furthermore, teachers' engagement with technologies through CoPs can provide opportunities to enhance their use during their work in the classroom. Therefore, they are considered powerful tools for promoting learning in education from a quantitative and qualitative standpoint (COLL; MONERO, 2010).

Finally, five works are presented that compose the category "*Potencial constituição de uma nova CoP*", in which CoPs are treated as possible outcomes of the union of teachers and students in a specific activity. Such is demonstrated in the article by Micaías Rodrigues, Valéria Santos, and Agnaldo Arroio (2020, p. 1275, our translation) involving two groups of physics teachers and undergraduates who "use Wenger's Community of Practice presence indicators to verify if the classroom study activities led to the formation of these." Thus, unlike the other works that already developed their studies with a formed CoP, in this category, the articles bring potential groups, events, and moments that may result in the formation of a new CoP in the school and/or higher education environment.

This flexibility of functions and benefits that a CoP can generate is also presented by Silva (2015, p. 17, our translation) when stating that:

In collaborative contexts like these, formed by heterogeneous groups, it is possible to develop together a series of practical actions, such as: conducting theoretical-methodological studies, elaborating teaching resources, reflecting on teaching strategies, producing narratives, problematizing the formative process, reflecting on practice in order to refine and improve it, among others.

Regarding the participants involved, the importance of interaction among individuals with different knowledge, qualifications, and expectations regarding teaching work is emphasized, where all seek constant improvement in the profession. In this regard, the CoP generally comprises a heterogeneous group of individuals, namely, teachers from different areas, with diverse knowledge and experiences.

The CoPs described in these categories demonstrate the development of individual and collective learning through social relationships; moreover, they assist in creating a sense of belonging and identity, mutual engagement, joint endeavor, and shared repertoire (WILBERT; DANDOLINI; STEIL, 2018). The exchange of experiences and sharing of knowledge highlights how individuals progress within a Community of Practice. In this environment, learning occurs, and individuals develop personally and professionally. In continuous interaction with other members, there is a constant (re)writing of one's narrative of learning and growth, propelled by collaboration and sharing experiences and knowledge (DAVENPORT; PRUSAK, 1998; ESTEVES, 2010).

Finally, without questioning the relevance of the CAPES Periodicals Portal, it is vital to highlight the limitations of this research. Not all journals are indexed in this platform, and its update is not synchronized with the publications on each journal's website. However, it is crucial to emphasize that, even if they are not part of this sample, various research groups and studies have conducted important work on Communities of Practice (CoP).

Final considerations

The research conducted here mapped Brazilian research on Communities of Practice among teachers over the past two decades. For this purpose, the methodology related to the State of the Art was employed, investigating publications in the CAPES Periodicals Portal using the descriptor "Communities of Practice" combined with six other descriptors.

Among the 33 results used in this study, it was observed that CoPs are still under-studied in the areas of Science Education, especially concerning the school environment. Studies on this topic were more frequent in the areas of Mathematics and Languages, developed in the South and Southeast regions of Brazil. When they occur, they result in a potent qualification for the participants, contributing to professional identity and/or the development of specific knowledge and activities.

According to the analyzed studies, participation in communities of practice provided various knowledge agents with valuable opportunities for improvement, both in teaching practice and in the development of interpersonal skills and personal growth. Participants benefited from enriching moments for a better teaching qualification, more meaningful interaction with their peers, and deeper personal development. Communities of Practice (CoPs), when established in a planned and systematic manner, emerged as powerful strategies to stimulate creativity, promote individual and group competencies, and generate significant innovations in the educational context.

Although CoPs have emerged as a promising space for the professional development of teachers and future educators, none of the studies in this survey found analyses of CoPs created by the members of the school community themselves. Therefore, it is expected that future research will identify and seek to understand the potential school settings where the spontaneous formation of these groups occurs.

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