A PRODUÇÃO DA ANPED SOBRE PROFESSORES INICIANTES E GRUPOS COLABORATIVOS EM EDUCAÇÃO MATEMÁTICA (2000-2015)

LA PRODUCCIÓN DE LA ANPED SOBRE PROFESORES INICIANTES Y GRUPOS COLABORATIVOS EN EDUCACIÓN MATEMÁTICA (2000-2015)

ANPED'S PRODUCTION ABOUT INITIATING TEACHERS AND COLLABORATIVE GROUPS IN MATHEMATICAL EDUCATION (2000-2015)

Klinger Teodoro CIRÍACO[1]
Maria Raquel Miotto MORELATTI[2]

RESUMO: Analisar a produção do conhecimento sobre a tendência investigativa dos trabalhos publicados nas reuniões anuais da Associação Nacional de Pós-Graduação e Pesquisa em Educação – ANPED- constitui-se foco central deste artigo. Para este fim, recorre-se a uma metodologia do tipo estado da arte na tentativa de caracterizar a produção do conhecimento "de" e "sobre" Educação Matemática e Formação de Professores no período de 2000 a 2015 a partir dos descritores "Processos Formativos e Aprendizagem da Docência", "Dificuldades de Professores Iniciantes", "A Formação do Professor e o Ensino de Matemática" e "Contextos de Colaboração Docente". A realização deste procedimento se justifica pela necessidade conhecer, de forma mais abrangente, o que tem sido realizado em termos de pesquisas acadêmicas acerca da temática para validação de uma proposta de doutoramento em educação. Da análise de dados, conclui-se que existe uma lacuna na produção do conhecimento quando se trata de estudar práticas colaborativas que visam articular professores de diferentes níveis de ensino em relação à Matemática, o que reforça a necessidade da implementação de iniciativas desta natureza.

PALAVRAS-CHAVE: Estado da arte. Educação matemática. Formação de professores. Grupos colaborativos. Iniciação à docência.

***RESUMEN**: El análisis de la producción del conocimiento sobre la tendencia investigativa de los trabajos publicados en las reuniones anuales de la Asociación Nacional de Postgrado e Investigación en Educación - ANPED- constituye un foco central de este artículo. Para este fin, se recurre a una metodología del tipo estado del arte en el intento de caracterizar la producción del conocimiento "de" y "sobre" Educación Matemática y Formación de Profesores en el período 2000 a 2015 a partir de los descriptores "Procesos Formativos y "Aprendizaje de la Docencia", "Dificultades de Profesores Iniciantes", "La Formación del Profesor y la Enseñanza de Matemáticas" y "Contextos de Colaboración Docente". La realización de este procedimiento se justifica por la necesidad de conocer, de forma más amplia, lo que se ha*

[1] Federal University of São Carlos (UFSCar), São Carlos – SP – Brazil. Adjunct Professor of the Department of Pedagogical Theory and Practice (DTPP), Center of Education and Human Sciences (CECH). Permanent Professor of the Postgraduate Program in Mathematical Education, Institute of Mathematics (UFMS). PhD in Education (UNESP). ORCID: https://orcid.org/0000-0003-1694-851X. E-mail: ciriacoklinger@gmail.com

[2] São Paulo State University (Unesp), Presidente Prudente – SP – Brazil. PhD Assistant Professor of the Department of Mathematics and Computation (DMC). Coordinator of the Postgraduate Program in Education (PPGE), College of Sciences and Technology (FCT). ORCID: https://orcid.org/0000-0001-5712-3237. E-mail: maria.raquel@unesp.br

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realizado en términos de investigaciones académicas acerca de la temática para validación de una propuesta de doctorado en educación. En el análisis de datos, se concluye que existe una laguna en la producción del conocimiento cuando se trata de estudiar prácticas colaborativas que apuntan a articular profesores de diferentes niveles de enseñanza en relación a la Matemática, lo que refuerza la necesidad de la implementación de iniciativas de esta naturaleza.

***PALAVRAS-CLAVE**: Estado del arte. Educación matemática. Formación de profesores. Grupos colaborativos. Iniciación a la docencia.*

***ABSTRACT:** The purpose of this article is to analyze the knowledge production about the investigative tendency of the works published in the annual meetings of the National Association of Postgraduation and Research in Education. For this, a state-of-the-art methodology is used to characterize the production of knowledge about Mathematics Education and Teacher Formation in the period from 2000 to 2015. The descriptors used were "Formative Processes and Teaching Learning", "Beginner Teacher Difficulties", "Teacher Formation and Teaching Mathematics" and "Teaching Collaboration Contexts". This procedure is justified because of the need to know what has been done in terms of academic research on the subject for validation of a doctoral proposal in education. From data analysis, it is concluded that there is a gap in the production of knowledge in the study of collaborative practices that aim to articulate teachers of different levels of teaching in relation to Mathematics, which reinforces the need to implement initiatives of this nature.*

***KEYWORDS:** State of the art. Mathematical education. Teacher formation. Collaborative groups. Introduction to teaching.*

Introduction

Teacher formation is a fruitful and necessary study and research theme in recent years. Understand the production of knowledge on this subject, specifically, in relation to formation, professional initiation and collaboration practices, whether in the field of Pedagogy and/or in Mathematics, the focus of this article.

The justification for such an approach concerns the question that this work is linked to a broader research, at the doctoral level, in which the objective was to carry out an initial mapping in an attempt to validate the thesis proposal[3] defended in the Postgraduate Program in Education at the Faculty of Science and Technology of São Paulo State University - FCT/UNESP, Presidente Prudente-SP.

Thus, the discussion that follows seeks to demarcate teacher formation as an investigative field in our country and, subsequently, to highlight, based on the production of

[3] Oriented by Prof. Dr. Maria Raquel Miotto Morelatti.

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knowledge, elements that justify the choices and paths taken for the constitution of a research proposal developed in a collaborative working group with teachers who teach mathematics at the beginning of their careers in the municipality of Naviraí, in the interior of the State of Mato Grosso do Sul - MS.

Putting down stakes: the methodological procedure used to survey

The methodological principle adopted here refers to the State of the Art methodology, with the objective of identifying the investigative trend of studies published from 2000 to 2015 in the annual meetings of the National Association of Graduate Studies and Research in Education - ANPED[4].

According to Morosini and Fernandes (2014, p. 155), the state of knowledge refers to a type of research that is defined by "[...] identification, registration, categorization that lead to reflection and synthesis about production scientific research in a given area, in a given period of time [...]"[5].

The consultation took place in the work groups "Teacher Formation" (WG 08) and "Mathematical Education" (WG 9) and was based on finding articles[6] that discussed the following themes: "Formative Processes and Learning to Teach", "Difficulties of Beginning Teachers" and "Contexts of Teaching Collaboration".

Thus, we proceeded with the reading of all the texts of the WGs, in the perspective of finding those that best fit the profile of the doctoral research work to be developed by the author of this article.

When working on the articles, we sought to identify gaps in the production of knowledge about teacher formation that supported the proposal for the development of the thesis presented to the Graduate Program in Education at FCT / UNESP: the constitution of a collaborative working group with beginning teachers in the pedagogical area (degree in Pedagogy) and in the specific area (degree in Mathematics).

What do research say about beginning teachers and collaborative groups?

[4] This initial survey was carried out predominantly in this database, since it is a national meeting and covers different Brazilian regions.
[5] "[...] identificação, registro, categorização que levem à reflexão e síntese sobre a produção científica de uma determinada área, em um determinado espaço de tempo [...]".
[6] All works were grouped in the dimensions mentioned, regardless of which WG the text was published in..

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The objective of this section is to present an overview of the works published in Brazil in relation to teacher education, based on centralizing axes that seek to characterize the predominance of academic knowledge production, about learning to teach, teaching Mathematics, but also the collaborative context established based on dynamics of interaction between teachers and researchers from intervention proposals in the school environment.

After mapping on the ANPED portal, a table was organized to illustrate the trend of research in the circumscribed period for the survey:

Table 01 - Investigative trend of works on teacher formation published in the annual meetings of ANPED (2000-2015)

	RESEARCH THEME		
YEAR	**Formative processes and learning to teach**	**Difficulties of beginning teachers**	**Contexts of teaching collaboration**
	Number of published works		
2000	6	–	–
2001	1	1	3
2002	1	–	1
2003	–	–	1
2004	–	1	3
2005	4	3	1
2006	5	–	2
2007	3	–	2
2008	8	–	1
2009	5	–	2
2010	8	1	1
2011	6	–	1
2012	6	–	2
2013	5	1	2
2015	6	2	5
Total	**64**	**9**	**27**
TOTAL OVERALL OF WORKS			**100**

Source: Devised by the author from ANPED, 2015.

In general, the texts found in the meetings focus on discussions about teacher formation and the constitution of pedagogical practice, whether at an initial or continuous level.

Regarding the theme "**formative processes and learning to teach**", we are interested in those who sought to discuss aspects of learning to teach mathematics and characterize the initial phase of teaching. Among the 64 studies, only 10 articles served to better understand the

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points that underlie research in recent years: a) those that problematize the relationship between formation and entering a career, for example, Nono and Mizukami (2006), Rocha (2004) and; b) those who seek to understand the movement of learning to teach in the teaching of Mathematics, experiences present in Lopes (2005), Megid and Fiorentini (2010), Silva and Cedro (2015).

Regarding the "**difficulties of beginning teachers**", I highlight the presence of the smallest number of studies, which demonstrates the need for investments in research aimed at identifying and working with teachers on their formation needs in the first years of teaching. In this perspective, I describe these studies in more detail as they reveal proximity to the objectives of the construction of the doctoral thesis that contains the discussion in this article.

Of the works found, Gama and Gurgel (2001) characterized the senses and dilemmas of mathematics teachers at the beginning of their careers, with the aim of presenting the transition from initial formation to entering the profession. The absence of systematic discussions on the topic, in particular the initiation of a career in the teaching of Mathematics, mobilized the authors to approach this object of study.

The methodological procedures adopted were based on multiple strategies "[...] such as life stories, semi-open questionnaires and other written records [...]"[7] (GAMA; GURGEL, 2001, p. 04). The universe researched concerns four professors who graduated from the Mathematics degree course, two men and two women, and of these, two were invited professors and two from tender.

For the authors, the teachers' feelings and dilemmas confirmed aspects pointed out by the literature about this moment of teaching life, since, from the data, it was possible to verify the presence of difficulties in the socialization process in the school environment, which contributed to the isolation of the teacher, dilemmas arising from students' lack of discipline and difficulties with the organization of mathematical content.

The conclusion of this research pointed to the need to create contexts to support the novice teacher, denoting that he needs a reference, to know how to build reflective processes to develop professionally (GAMA; GURGEL, 2001).

Rocha (2004), in his master's dissertation, discussed how learning to teach of a beginning PhD teacher, who worked in the initial grades of elementary school, is configured. To carry out the research, the author relied on data obtained from the "[...] writing of a reflective diary prepared by the participating teacher, with the intention of knowing how she would build

[7] "[...] como histórias de vida, questionários semiabertos e outros registros escritos [...]"

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the beginning of her teaching experience during her first year of professional performance"[8] (ROCHA, 2004, p. 01). In addition, the researcher had two meetings with the study collaborator, to discuss some situations described in the reflection diary.

The results showed that, despite the high level of formation of the beginning teacher, the years of study and research in the educational field, the conclusion of her doctorate contributed little to the professional exercise of teaching and the central difficulties in her work collided with the heterogeneity of classroom, the establishment of rules with the students and with the indiscipline in the overcrowded class (ROCHA, 2004). However, it is noteworthy that despite the initial career challenges, the teacher reported that "[...] I would not be able to overcome everything that happened if I did not have the theoretical foundation accumulated during my academic life, recognizing the value of my professional formation"[9] (ROCHA, 2004, p. 03).

This undoubtedly demonstrates that teacher formation is an ongoing process and that teachers will always be on the learning path.

Similar to the study by Gama and Gurgel (2001), Rocha and Fiorentini (2005) also analyzed the constitution of being a mathematics teacher in the initiation phase. The authors' objective was to verify how "[...] the mathematics teacher, in the transition from student to teacher, constitutes himself professionally and, in particular, to understand how the process of mobilizing his knowledge acquired throughout life happens [...]" (ROCHA; FIORENTINI, 2005, p. 01), especially in undergraduate studies, during the first years of teaching.

The research in question had two phases, the first of which occurred through contact with a group of graduates (teaching degree) in Mathematics at the State University of Campinas - UNICAMP - through the application of a questionnaire, in which it was verified which were the teachers who were in activity. In the second stage, contact was made with two professors, for a more in-depth case study.

The data collection instruments for obtaining the necessary information for the study were: semi-structured interviews, observation of classes, records (audio/video) and the researcher's field diary. In this context, as the subjects were two teachers, it was possible to identify important elements of the history of each teacher and that contributed to the process of reconstitution of the teaching knowledge in Mathematics in the initial phase of the profession.

[8] "[...] escrita de diário reflexivo elaborado pela professora participante, com a intenção de conhecer como ela construiria o início de sua experiência docente durante o seu primeiro ano de atuação profissional"
[9] "[...] não conseguiria superar tudo o que passou se não tivesse o embasamento teórico acumulado durante a sua vida acadêmica, reconhecendo o valor de sua formação profissional"

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Still for the authors, another fundamental instance for the formation and professional development of teachers is the context of reflection and sharing of experiences, a frequent data in the responses of the recent graduates participating in the research, which were provided in the context of the Mathematics course in the disciplines Teaching Practice and Supervised Internship (ROCHA; FIORENTINI, 2005).

This particular situation, of the formation of these beginning teachers, contributed to the reconstitution of their knowledge and also to cope with the feelings present in the insertion phase.

Corsi's research (2005) analyzed difficult situations faced by two teachers in the early years during the first years of teaching. In the referred study, the author had as source of data collection, records in reflective diaries, monthly interviews elaborated from the information contained in the teachers' writing.

Among the aspects that hindered this period of entry into the career, the teachers mentioned the students' behavior in relation to the discipline and the forms of organization and conceptual approach with the contents, although in a subtle way, but this was present in the written reports and, for Corsi (2005), the explanation for this issue is due to the fact that beginning teachers seem to be unaware that they do not master certain school contents.

In common, the research results indicated that the work with written narratives presents itself as an important and promising investigative methodological possibility, as it allows the teacher to explain his thoughts and actions in an act of reflection on the practice school. For Corsi (2005), this data implies a process of reframing the experience, since the teacher can resume his work, trying to remedy the previous gaps observed.

Lima (2005) developed an investigation that was based on characterizing dilemmas "[...] of elementary school teachers (initial grades) and understanding how conflicts/difficulties in the development of their practices, may or may not become knowledge for learning to teach"[10] (LIMA, 2005, p. 01). The study collaborators were teachers with up to six years of experience and who participated in the Pedagogy course for practicing teachers.

The author worked with the students' memorials and semi-structured interviews as a direct source of information for conducting the research.

For Lima (2005, p. 05), the teaching initiation phase can be considered a moment "[...] of tensions/ conflicts/ dilemmas in contexts that may or may not be known, during which

[10] "[...] dos professores do Ensino Fundamental (séries iniciais) e compreender como os conflitos/dificuldades no desenvolvimento das suas práticas, podem, ou não, se converter em saberes para a aprendizagem da docência"

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teachers should acquire knowledge professional, besides being able to maintain a certain personal balance".

However, at the time of publication of the text, the investigation was not yet finalized, but pointed to the possibility of favoring a more detailed understanding of this phase of the teacher's life, about learning to teach.

Carneiro and Passos (2010) present results of a master's research in which the objective was to understand "[...] not only the contributions of the Mathematics Degree to the use of Information and Communication Technologies in the classes of teachers at the beginning of their careers , but also the characteristics of this teaching phase [...]"[11] (CANEIRO; PASSOS, 2010, p. 01).

The study is justified by the fact that it is necessary to understand how mathematics teachers, graduates of a public university, were formed to deal with technologies in the educational context. The authors developed a research plan that aimed at two moments of applying questionnaires and another with semi-structured interviews with teachers who were willing to contribute voluntarily. The participating subjects were four mathematics teachers who declared, in response to the questionnaires, to work with technologies in the classroom.

The characteristics of using ICTs were identified as being challenging during initiation to teaching, since, for teachers, using the computer in class is difficult because "[...] students see the computer as an object of entertainment and leisure [...]"[12] (CARNEIRO; PASSOS, 2010, p. 07).

This situation was described by the teachers surveyed as exhaustive, because the students' initial thrill and enthusiasm ended up damaging the pedagogical objectives of the activity proposal, in the first times when they used technology.

In conclusion, the authors state that, with the research, it was possible to raise diversified experiences lived by teachers in which technology was used in different ways, so that students would feel more motivated in learning. For beginning teachers, the positive results, after the process of using these resources, contributed to overcoming the difficulties for staying in the profession.

[11] "[...] não apenas as contribuições da Licenciatura em Matemática para a utilização das Tecnologias da Informação e Comunicação nas aulas dos professores em início de carreira, mas também as características dessa fase docente [...]"
[12] "[...] os alunos veem o computador como um objeto de entretenimento e lazer [...]"

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In short, the data signaled that technology is a source of empowering learning and that, when the teacher has mastery of it, it is possible to make students explore, raise conjectures, test hypotheses, among others (CARNEIRO; PASSOS, 2010).

Duarte (2013) spoke in a proposal for a master's study, under development, which aims to understand the implications of school culture in the constitution of the professionalism of beginning teachers. The adopted methodology is inserted in qualitative studies in education, the author observed classes and accompanied eight teachers from meetings with a focus group.

The proposal is aimed at understanding the difficulties of teachers to become a teacher, as they constitute specificities of teaching action.

Gariglio (2015) analyzed the professional initiation processes of graduates in Physical Education. The author sought to identify perceptions and movements of learning during the first career years and, for this, the instruments of data collection were interviews and analysis of teaching cases, based on the written records of the teachers.

The conclusions pointed to "[...] the situated character of the initiation to teaching in which singularities of experiences and perceptions about this professional development cycle can be verified"[13] (GARIGLIO, 2015, p. 01). In this sense, this character concerns the context of the insertion of these teachers, which has shown to be strongly linked to the field of the disciplines in which they work (GARIGLIO, 2015).

In a new publication, Duarte (2015) highlighted the final results of her research. This time, the author presented the constitution of becoming a teacher at the beginning of teaching and the specifics of this action.

The final data highlighted that, for teachers, there is incompatibility between theory and practice, that is, in the relationship between the knowledge acquired in the initial formation course and the knowledge necessary for the exercise of the career.

According to Duarte (2015, p. 11), this conflict occurs because teachers have "[...] understanding of theory as something that should be applied to a predefined reality, which does not change and which is constituted by ideal models"[14]. This experienced conflict ends up contributing to the strengthening of the sense of experience attributed by teachers to the constitution of pedagogical practice.

[13] "[...] o caráter situado da iniciação à docência no qual se podem verificar singularidades de experiências e percepções sobre esse ciclo de desenvolvimento profissional"

[14] "[...] compreensão da teoria como algo que dever ser aplicado a uma realidade predefinida, que não se altera e que é constituída por modelos ideais"

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The production of knowledge about "**teaching collaboration contexts**" clusters studies aimed at experiences in groups of studies and research; studies in collaborative action research, research-intervention and research-formation projects; cultures of teacher professional development and collaboration; issues related to pedagogical supervision and collective work in the school space and collaborative groups (FERREIRA, 2004; COSTA, 2006; GAMA; FIORENTINI, 2008; CRECCI; FIORENTINI, 2012; AZEVEDO, 2013).

Studies that cover similar issues and that, in a way, contribute to a better outline of the thesis presented in this text, are part of the works that discussed cultures of professional development, collaborative work at school and collaborative groups.

Research such as that of Gama and Fiorentini (2008), Nogueira, Almeida and Melim (2013), Mollica and Almeida (2015) sought to characterize processes of initiation to teaching in collaborative environments under different methodological perspectives.

Among these studies, I highlight Gama and Fiorentini (2008), for being a research with characteristics close to the proposal of the thesis I developed. In the text, the authors reported results of a doctoral research in which the object of investigation was the professional development of mathematics teachers beginning with the support of collaborative groups. As an excerpt from the study, in the article in question, the contributions of the interactions in this formative space of the groups for the constitution of the teachers' identities are presented.

The identification of collaborative groups, whose members were beginning teachers, occurred from the application of a questionnaire answered by 60 subjects from the region between the cities of Campinas and Ribeirão Preto/SP. In the analysis of the responses, the presence of 3 groups was found[15] and one participant from each was selected, for further study.

The groups that supported the completion of the thesis had common characteristics, centered on research and reflection on teaching practice in order to "[...] build knowledge aimed at the professional and personal development of teachers"[16] (GAMA; FIORENTINI, 2008, p. 04).

In conclusion, the authors signaled that the reflective space, made possible by the insertion and performance in the study group, is configured as a support mechanism for beginning teachers, as it provides research environments on their own pedagogical practice, both individually and collectively. In this sense, in summary, it is in the dialogue with others

[15] Saturday Group (GdS/FE-UNICAMP); Mathematical Education Group (GEM/DEME-UFSCar); Collaborative Group of Studies in Mathematical Education (GCEEM/Regional Directorate of Americana).
[16] "[...] construção de conhecimentos voltados ao desenvolvimento profissional e pessoal dos professores"

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that mathematics teachers are "[...] influenced and influence in this process of constituting individual and collective identities in the group"[17] (GAMA; FIORENTINI, 2008, p. 09).

Research such as Soares and Pinto (2001), Ferreira (2004), Lopes (2004), Costa (2006), Crecci and Fiorentini (2012) and Azevedo (2013) also discussed the process of collaboration in teacher formation and practice who teaches mathematics.

In these studies, collaborative work is described as an alternative for the construction of autonomy and professional development. Thus, the groups are the investigative basis for the development of theories about the culture of teaching communities.

Ferreira (2004) analyzed the professional and metacognitive development of mathematics teachers based on participation in a collaborative work group. This qualitative research proposed to answer what are the contributions of participation in this group, constituted by the author, who was aimed at deepening the knowledge of the profession and processes of metacognition for teaching practice.

The study participants worked in the public school system in Campinas / SP and the data collection took place from weekly meetings, which were recorded and later transcribed by the researcher. Some teachers' classes and other records were followed, such as the observation script, which were produced in the period of one year of fieldwork.

The results demonstrate that, the members went through several moments during the year of constitution and formation of the group. In this collaborative environment, initially, teachers expected a more passive posture during the meetings and, over time, started to integrate and make collective decisions for the management of reflection proposals, which demonstrated the great potential of collaborative work in professional development.

However, Ferreira (2004) signaled that the learning in this space was different for each teacher, given the characteristics of each one, linked to the life history, formation, interests and time of teaching practice. For the author, the group's experience also proved to be a catalytic context for learning to teach, but, in the conclusions, she left an alert that works of a similar nature may be limited due to the short time for reflections, since, in this research, this factor was unfavorable, because, at the end of the thesis, she noticed that the process was just beginning with the teachers.

Lopes (2004) worked with a group of teachers of Early Childhood Education in order to investigate professional development in relation to Mathematics, more specifically, Statistics and Probability in childhood. In the author's view, the study's contribution lies in expanding a

[17] "[...] influenciados e influenciam nesse processo de constituição das identidades individuais e coletivas no grupo"

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line of investigation that "[...] has a clear importance of working in partnership with teachers and the perception of the richness of the acquisition of collective knowledge"[18] (LOPES, 2004, p 02).

In this perspective, the research considered that the participation of teachers would have to be an option that aimed to contribute to their professional development. The analysis of the knowledge and practice of teachers, would be the result of information from diverse sources, organized from didactic-pedagogical problems related to the teaching/learning of Statistics in Early Childhood Education (LOPES, 2004).

The author takes the position that the reflective process is important for the construction of autonomy and collaborative work with teachers. To this end, she developed the study in a group formed by her and participating teachers, in which she sought to understand the following question: "**What contributions does the study, the experience and reflection on concepts of statistics and probability can bring to professional development and pedagogical practice of a group of early childhood teachers?**" (LOPES, 2004, p. 13, author' highlights).

In the analysis carried out, it was evidenced that the reflection movement, enabled the construction of new knowledge and specific professional knowledge, linked to the contents of combinatorics, statistics and probability, foreseen by the curriculum. The teachers, produced knowledge of the profession in a creative and conscious way, in order to contribute to the theme (LOPES, 2004).

In short, the continuous formation research in the collaborative environment, showed that this work perspective, allows the improvement of teaching practice and expands professional autonomy, based on the permanent reflection of the teaching and learning process.

Costa (2006) developed a study, at the doctoral level, with collaborative characteristics, motivated by the low emphasis of Brazilian studies in relation to the use of Information and Communication Technologies (ICTs), by Mathematics teachers in public schools. In this research, the author worked with a collaborative project to initiate the use of technologies, in a school in the municipality of Tubarão/SC, in which those involved were mathematics teachers and the project coordinator, in this case the researcher.

The study experience was carried out in order to verify what happens, in the sense of changes in the professional culture when a collaborative group is constituted in the school, by the teachers, for the introduction of ICTs in the teaching practice (COSTA, 2006). Case studies were prepared "[...] associated with this experience of introducing ICTs in the school practice

[18] "[...] tem clara a importância do trabalho em parceria com professores e a percepção da riqueza da aquisição do conhecimento coletivo"

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of the two teachers: Joelsa's case study; the case study of Cida and the case study of the movement of constitution, work and consolidation of the group"[19] (COSTA, 2006, p. 08).

Over time, with weekly meetings and in the proposed study circles, from the dynamics of distance courses and subsequent face-to-face discussions, the group acquired collaborative characteristics.

According to the author, the perspective of collaborative work broke with the profession's individualism and empowered participating teachers. "Thus, supported by the group, they dared, incorporating ICTs in the teaching work and in the education of students"[20] (COSTA, 2006, p. 11).

There were many contributions to the use of technologies in the group, as the interactions triggered changes in the culture of teachers as they perceived new configurations in their pedagogical practice with the use of ICTs. The research shows that collaborative work experiences involving teachers and researchers in a movement to reflect on the practice, contribute to the professional development of the participants.

Crecci and Fiorentini (2012) discussed the constitution of teaching professionalism, in investigative communities based on collaborative groups. Thus, for research, the authors considered groups "[...] that reflect and investigate the pedagogical practice itself, using different modalities of research or systematic analysis of the practice, as research communities"[21] (CRECCI; FIORENTINI, 2012, p. 01).

The aim of the study was to understand learning, professional development and the constitution of professionalism, based on evidence of the participation of teachers in collaborative groups that investigate the teaching and learning process. Those involved were teachers who teach mathematics and participate in these research communities.

Data collection took place in three phases: 1st) sending questionnaires by e-mail to professors participating in collaborative groups, which were identified from texts published in conference proceedings and / or books; 2nd) interview with four professors from these groups, in order to deepen the investigation regarding the constitution of professionalism in these collective spaces and; 3rd) participant observation with records in the researcher's field diary,

[19] "[...] associados a essa experiência de introdução das TICs na prática escolar das duas professoras: o estudo de caso de Joelsa; o estudo de caso de Cida e o estudo de caso do movimento de constituição, trabalho e consolidação do grupo"

[20] "Assim, apoiadas pelo grupo ousaram, incorporando as TICs no trabalho docente e na educação dos alunos"

[21] "[...] que refletem e investigam sobre a própria prática pedagógica, utilizando diferentes modalidades de pesquisa ou análise sistemática da prática, como comunidades de investigação"

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as well as participation in the study meetings of the collaborative groups in which the teachers interviewed were members.

In this last phase of the field research, the intention was "[...] to collect information that allows describing the dynamics of work and study of collaborative groups [...]"[22] (CRECCI; FIORENTINI, 2012, p. 04).

The doctoral study in question was, at the time of publication in ANPED, in the final stage of collection and beginning of data analysis. In this perspective, some partial results indicated evidence that, the collaborative groups have raised elements that allow the constitution of research knowledge about the pedagogical practice of the teachers who participate in them (CRECCI; FIORENTINI, 2012).

Another relevant issue is that, in the case researched by the authors, becoming a teacher seems to be directly linked to the analysis of the practice, since the members of the groups "[...] problematize their knowledge and stop being uncritical consumers of ideas managed by specialists"[23] (CRECCI; FIORENTINI, 2012, p. 04), that is, they gain greater autonomy.

Azevedo (2013), in the last study found and developed with groups of teachers, describes the doctoral proposal, defended at the Federal University of São Carlos - UFSCar -, in which he reported the learning of teachers of Early Childhood Education, in an experience of continuing formation, involving mathematical knowledge.

The group was integrated by the researcher and was called "Others Looks at Mathematics" - GEOOM. The members, 39 teachers of Early Childhood Education, worked in the municipal network of São Carlos/SP, met and lived, between the years 2010 and 2012, for five consecutive semesters (AZEVEDO, 2013).

Data collection was possible from the teachers' oral and written narratives, information from the researcher's field diary and a questionnaire applied at the end of the proposed formative experience. The management of the actions was based on theoretical studies on the contents and on reflective discussions about teaching practice throughout the entire process.

With the intervention carried out, there was evidence of the potential of interactions in the group for the practice of teachers, for specific knowledge of mathematical content and methodological resources for their approach. The debate on methodological issues in the group's collaboration space has not become detached from the conceptual aspects of

[22] "[...] coletar informações que permitam descrever as dinâmicas de trabalho e estudo dos grupos colaborativos [...]"
[23] "[...] problematizam seus conhecimentos e deixam de ser consumidores acríticos de ideias gestadas por especialistas"

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mathematical properties, since "[...] only technique does not account for the complexity of the process of teaching and learning mathematics in childhood"[24] (AZEVEDO, 2013, p. 15).

The conclusions pointed out that forms of teaching and learning mathematics in the field of Early Childhood Education were constituted by the teachers and redirected collectively in the GEOOM space, always with respect to the theoretical and methodological specificities of each teacher, in a perspective of reflection on the pedagogical practice.

The results of research in contexts of teaching collaboration, in collaborative groups, portray situations in which the formative space made possible by the sharing and reframing of experiences provides the teacher with professional development and autonomy. This element reinforces the need to invest in proposals developed "with" teachers and not "about" them.

In this investigative context, I call attention to the small number of studies related to the difficulties of beginning teachers and to the collaborative work with teachers who teach mathematics, be it mathematical educator or pedagogue.

Final considerations

In the works analyzed in this paper, it is observed that among the 100 articles, only 9 were intended to discuss the difficulties of the initial years of teaching and, of these, 3 addressed questions about teaching in Mathematics (GAMA; GURGEL, 2001; ROCHA; FIORENTINI, 2005; CARNEIRO; PASSOS, 2010). And, of 27 who proposed to address teaching collaboration processes, 6 were in the field of research in Mathematics Education.

This low proportionality reinforces the relevance of proposing a specific research with beginning teachers in a collaborative work group, which aims at interaction, between subjects with different formation profiles for teaching mathematics, that is, a space for permanent reflection on teaching practices of Mathematicians and Pedagogues, since the previous researches worked, sometimes with groups made up of mathematicians (FERREIRA, 2004; COSTA, 2006; GAMA; FIORENTINI, 2008), and sometimes pedagogues (LOPES, 2004; CRECCI; FIORENTINI, 2012; AZEVEDO , 2013).

In other words, it was not possible to identify yet another study, which aims at the interaction between Mathematics teachers and Pedagogues, a characteristic that constituted a central element of the thesis I developed. When we relate the initiatives to enhance the teaching career, it is possible to verify that there are great concerns, both in relation to the proposals and

[24] "[...] só a técnica não dá conta da complexidade do processo de ensinar e aprender matemática na infância"

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programs of initial and continuing formation, but when we think about the period of induction, insertion and permanence in the teaching career, there is a vacuum in government proposals and in some research, as observed in the survey conducted with the ANPED, which signals a certain abandonment for this important period in the constitution of the teaching identity.

This fact presents yet another reason for cutting the theme in research processes on the beginning of teaching, in an attempt to characterize particular feelings of that period.

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