

RESEARCH ARTICLE

Teaching To Do Research in Postgraduate Teacher Training for Secondary School Teachers in Colombia.

Enseñar a investigar en la formación docente posgradual de maestros y maestras de la educación básica secundaria en Colombia

Docência à pesquisa na formação docente de pós-graduação de professores do ensino médio básico na Colômbia

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ABSTRACT

The purpose of this article is to analyze the training path of teachers who decide to continue their teacher training with a master's degree in education and to talk about how research is taught at this level of training. The routes and methodologies created and implemented by teacher trainers to teach research are reviewed based on the premise that teaching produces specific knowledge which is transmitted by those who teach. In addition, some reflections -from the teachers in training- about research learning are discussed. These analyses are rooted in a chain of projects -which have been developed to research the field of teacher training in Colombia- resulting from the doctoral research "Existing links between postgraduate teacher training and the elementary and high school teaching profession in two Colombian cities: Pasto and Valledupar". However, this reflective and critical exploration is limited to reporting the research results of one of these projects: "Narrative understandings of research in postgraduate teacher education"; which was developed between 2018 and 2019. Data collection and analysis were based on the narrative accounts of three teachers who graduated from the master's Program in Education. The resulting analyses of the teaching of research concern the need to be able to involve it in teaching practices, in the exercise of teaching knowledge from other places and incorporating new pedagogical, didactic and research elements into daily teaching practice.

RESUMEN

Se expone este artículo para hacer un análisis del recorrido formativo de los maestros que deciden continuar su preparación docente como magíster en educación, en particular, hablar de cómo se enseña a investigar en este nivel formativo. Se recuperan las rutas y metodologías creadas e implementadas por los formadores de docentes para enseñar a investigar, partiendo del reconocimiento que, en la enseñanza se producen saberes específicos de la transmisión por parte de quienes enseñan. Además, se recuperan algunas reflexiones —de maestras que se forman— acerca de los aprendizajes en investigación. Estos análisis se anclan en una cadena de proyectos —

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que han sido desarrollados para investigar el campo de formación docente en Colombia—resultantes de la investigación doctoral “Vínculos existentes entre la formación docente posgradual y el oficio de ser maestros de primaria y bachillerato en dos ciudades de Colombia: Pasto y Valledupar”. Sin embargo, esta andanza reflexiva y crítica se limita a exponer los resultados investigativos de uno de esos proyectos: “Comprensiones narrativas de la investigación en la formación docente en posgrados” desarrollado entre el 2018 y 2019. La obtención y análisis de datos se realizó a partir de relatos narrativos a tres maestras egresadas de una Maestría en Educación. Los análisis que se develaron sobre la enseñanza de la investigación tienen que ver con la necesidad de poder involucrarla en las prácticas docentes, en el ejercicio de enseñar un conocimiento desde otros lugares e incorporar nuevos elementos pedagógicos, didácticos e investigativos al ejercicio docente cotidiano.

RESUMO

Este artigo apresenta-se para analisar o percurso formativo dos professores que decidem continuar a sua preparação docente no mestrado em educação, em particular, para falar sobre como a investigação é ensinada neste nível de formação. Recuperam-se os percursos e metodologias criadas e implementadas pelos formadores de professores para ensinar a investigação, a partir do reconhecimento de que, no ensino, o conhecimento específico é produzido a partir da transmissão por quem ensina. Além disso, são recuperadas algumas reflexões – de professores em formação – sobre a aprendizagem na pesquisa. Estas análises estão ancoradas em uma cadeia de projetos – que foram desenvolvidos para investigar o campo da formação de professores na Colômbia – resultantes da pesquisa de doutorado “Vínculos existentes entre a formação de professores de pós-graduação e o trabalho de ser professores de escolas primárias e secundárias em duas cidades.” da Colômbia: Pasto e Valledupar”. No entanto, este percurso reflexivo e crítico limita-se a expor os resultados da investigação de um desses projetos: “Entendimentos narrativos da investigação na formação de professores de pós-graduação” desenvolvido entre 2018 e 2019. A recolha e análise de dados foi realizada a partir de histórias narrativas a três professores que concluiu o Mestrado em Educação. As análises que se revelaram sobre o ensino da pesquisa têm a ver com a necessidade de poder envolvê-la nas práticas docentes, no exercício de ensinar saberes de outros lugares e incorporar novos elementos pedagógicos, didáticos e investigativos ao exercício docente cotidiano.

Introduction

In the scenario of teacher training, within the framework of a Master's Degree in Education, as in other teacher training spaces, it is necessary to reflect on the place of the teacher-trainer, who is pedagogically, institutionally and socially responsible for carrying out teaching practices that group and reference others. These are teaching practices, which are carried out at the postgraduate education level, to train teachers who are going to develop professionally in other teaching practices. In this formative complexity, it is necessary to talk about the type of tools that teacher trainers have at the moment of teaching, understanding tools as the resources, routes, strategies or methodologies they use in practice.

Indeed, the teacher teaches others not only taking into account what he or she wants, believes and should teach, but also valuing previous knowledge. Teachers are professionals, they understand the exercise of teaching, of constructing teachable objects for students to appropriate knowledge. It is at this point, where it is considered that teacher training is a trajectory, understood as the various paths that each teacher in training finds and travels, it is the *framework* (Briscioli, 2016) that is being built as the reason for their training, re-signifying the process and appropriating what they are doing in this scenario.

This *framework* is built not only by the teacher who is being trained, but also by the teacher-trainer who configures his or her networks, his or her own ways of teaching, since from experience

the training routes are readjusted with each group of students. This issue is a turning point, where the richness of this paper lies; it is an attempt to recover the routes and methodologies created, implemented and rethought to teach and learn to investigate.

In these different instances of teacher training, an important diversity of knowledge circulates, with different contexts of reference, as in any teaching practice. There is knowledge that refers to disciplinary fields, others that refer to institutional practices, others that are built in the professional teaching practice and in the reflection on the practice. Terigi (2006) states that in teaching, knowledge that is produced in other instances is transmitted, but in the transmission a knowledge is generated in which the teacher is a specialist and which is often not recognized as such.

The article is organized as follows: first, an approach to some theoretical concepts to understand postgraduate teacher education; second, the methodological procedures used to obtain the data; third, the presentation of the analysis and discussions on the routes and methodologies developed by the teacher educators to teach research, these are presented in two parts: (i) Building methodological trajectories to teach research: The role of the teacher educator; (ii) Learning in research: The voices of Sandra, Nelcy and Pilar. And finally, the final considerations.

Theoretical conceptualization: Postgraduate teacher training, a scenario for learning, dialogue and qualification of the teacher's profession

Teacher training at any level -undergraduate or graduate- will always be a scenario of constant inquiry on how to learn and deepen the profession of being a teacher. In this case, postgraduate training provides spaces for deepening, dialogue, exchange of experiences, approach to other views on the profession of being a teacher and the ways of making knowledge teachable. It brings teachers closer to identify the possibilities offered by the reflection of their own practice and the framework that constitutes training to be a teacher, as well as the strategies that emanate from this training and that allow exploring a variety of alternatives and mechanisms for teacher development and updating proposals. This is how teachers, in all the scenarios where their profession is situated, need training processes, to find other marks and discourses that are built from theoretical circles and the teaching experiences of the profession itself.

In this regard, Terigi (2013, p. 9) considers that it is necessary to recognize "the complexity of teaching work, its political character and its institutional and, of course, collective nature". Postgraduate teacher training is the place where teachers acquire certain tools to continue cultivating their teaching practice; it is also where they can rethink and redefine their work. In this regard, Southwell and Vassiliades (2023, p. 9) consider that "the construction of a certain role for the task of educating has a rich history of practices, struggles, debates, disputes and proposals". From there it is that Rico's (2016) contributions focus on the importance of the management of teacher training in the university - a scenario worth mentioning - related to the institutional positions and approaches to configure places for postgraduate training and thus, link the curricula to the immediate realities of teachers in training, in this case, manage strategies that allow reducing the gap between what is done in a training scenario and what is experienced in the teaching practice.

Hence, it is appropriate to introduce some considerations on the importance of research practices in this type of training and, especially, in that of teachers who are being trained and who take their own practice as an object of study. At this point, a complex process takes place around how to investigate one's own practice, how to articulate or, at least, put into dialogue systematic, rigorous knowledge, such as scientific research pretends to be, with a knowledge that is produced in practice and that is neither systematic nor formalized.

As Cometta reviews, there are several antecedents on the "use of research in practice and the way to engage in reflective praxis from reasoning and practical debate" (Cometta, 2017, p. 9). In this sense, it is that teacher training is consolidated in a place for reflection, that is, to delve into the task, in order to generate other views and practices, in this case, from research on what the teacher does in school scenarios. This leads to the question: What is the place of teacher training in the teacher's work? How does the teacher internalize the acquired learning and materialize it in his or her work? (Nocetti and Medina, 2017).

Alliaud (2017) should be mentioned when he refers to the teacher as a craftsman, stating that "getting to know how to do something well takes time" (p. 85), this metaphor takes up the essence of postgraduate teacher training: to give continuity to the process of learning elsewhere. This allows us to consider what Martínez and Carreño (2020, p. 9) say about good professional work, which "must constantly make decisions and act in accordance with the purpose of their profession". Therefore, by giving continuity to their training, they are placed in a place of constant learning, favorable for their work, they are updating, looking for other ways to improve their practices and generate knowledge consistent with the realities of the students. Vergara (2017) considers that the

Teacher training implies promoting their professional and personal development, urging their intervention in the most concrete sphere of their practice, with the aim of reconstructing and recovering it. And, above all, the idea that all training implies a revision and a crisis, breaking with already established premises, and opening up to new ways of thinking and doing, with the consequent commotion caused by the rupture of schemes that are often already consolidated (p. 52).

In this way, Martínez, *et al.* (2015) refer to three aspects to understand postgraduate teacher training and the intrinsic relationship with teachers' experiences: (i) teacher qualification, as a criterion to be at the forefront of pedagogical, didactic and research contents of school scenarios; (ii) the close link to be forged between training, research and teaching practices; and; (iii) the updating of contents, schemes, models, pedagogical postures and situated research practices. These three aspects are considered to be traced by reflexivity, understood as "the process of recognizing and making explicit the territory, the position of the educational fact and the ways of being a teacher" (p. 72).

For their part, Sancho-Gil, *et al.* (2020, p. 146) consider that

in the field of educational research, exploring and reflecting on where, when, what and with what we learn in the different environments through which we move, can contribute to a better understanding of how we think and act as teachers and how we relate to our students. (Sancho-Gil, *et al.*, 2020, p. 146).

This leads to a discussion and analysis of other approaches to postgraduate teacher training, emphasizing the teaching of how to do research and the recovery of some practices and experiences of the research process. In other words, the particularities involved in the teaching of research practice become more complex.

As in the case of teaching and learning other practices, teaching and learning to do research requires the construction of devices on the part of teacher educators, in this case, so that teachers in training can appropriate the conceptual and instrumental tools necessary for the production of knowledge and action alternatives in and for their own teaching practices. This is corroborated by Rico (2020, p. 175) when he affirms that

The research action begins at the moment the teacher returns to his/her practices, he/she has the need to review the interior of his/her work, and for this, he/she recognizes research as the most dynamic route to consider his/her exercise and rethink his/her practices in a contextual, pedagogical way, and linked to the social conditions in which he/she develops as a teacher.

Methodological stance, strategies, techniques and tools

The methodological route was built from the qualitative paradigm (Vasilachis, 2006) and the biographical-narrative approach (Bolívar *et al.*, 2001) using the technique: narrative accounts, which assumes that "the narration of experiences leads to assign a meaning to what happened and that there may be something more to write about it in the teacher biography itself" (Rico, 2020, p. 102). This means that narrative research generates other forms of research in education; likewise, "the devices centered on the construction of experience narratives have spread in the territory of teacher training. However, their potential to favor the participation of teachers in research has not been sufficiently explored" (Suárez, 2021, p. 365).

In order to obtain the stories, the biographical interview was used (Bolívar *et al.*, 2001; Flick, 2007). With the stories, a reconstruction of the narrative of life was made, this reconstruction goes beyond the data and events that may circulate in life. For this article, three interviews with three female teachers, who completed their Master's degree in Education, are brought up, where six criteria were taken into account for the

construction of narrative accounts:

The biographical interview allowed the collection and detailed analysis of the data (Gibbs, 2007; Morales and Taborda, 2021), having pre-established categories, the interviews were transcribed without modification. These data were treated under the logic of open coding and organized in each of the established categories:

(i) research learning; (ii) training experiences in the university setting; and (iii) the meanings that are constructed from narrative research to address postgraduate teacher training. This article refers to the first category -research learning-.

In this way, the categories revealed the biographical analysis (Bolívar, *et al*, 2001), i.e., by entering into the narratives, a recognition was made of the knowledge of the other person, to know their experiences and learning acquired about the research. The data, being narrative, have an analytical treatment from a hermeneutic order, since a connection emerges between the field of study, the research and the participants (Landín and Sánchez, 2019). Thus, three phases were consolidated to obtain and define the data: (i) construction of the biographical narratives between the participants and the researcher (Bolívar, *et al*, 2003); (ii) data analysis strategies -biographical narratives- (Gibbs, 2007); (iii) creation of analysis matrices by research categories for the organization of the data obtained in the narratives (Gibbs, 2007).

Thus, this article proposes two sectors of analysis, the first one, that proposed by the teacher trainers, where the means, methods, designs and instruments are found; and the second one, from the stories of the three teachers. All this in order to answer: What meanings are configured in the research practices? What are the routes designed to teach research?

Results

Building methodological trajectories for teaching to research: The role of the teacher trainer

To teach methodology from situated research in the field of education is to understand contexts, perceptions, experiences and knowledge that teachers who are trained as masters have; these approaches were made to understand the various situations in which possible problems and questions arise to undertake a research. In this sense, the methods to do research allow to go towards what is a problem, to bring to light the data, events, manifestations, senses that surround it, "research methods are useful to move towards the subject of study and make rigorous the construction of theoretical interpretation" (Herrera, 2013, p. 192).

Within the research, the methodological bet led to generate links between the researcher and the contexts, that is, the role of the methodology is defined by the problem, "it becomes an instrument for data collection, it focuses on the meaning of the participants" (Creswell, 1994, p. 13), it enters into the facts of the context studied, it perceives them from the construction of natural, spontaneous meanings, connected with emotions, perceptions and manifestations of the participants themselves. This means that teaching to investigate is to turn around what happens in places, people, their experiences and knowledge; it is to *put* their lives *in parentheses*.

However, the construction of methodological trajectories in the postgraduate teacher training process had five moments: (i) Foundations and approaches; (ii) delimitation and emergence - here the context where the research is located is studied, the problem is defined from conceptual and contextual criteria, and a systematic review is carried out, that is, a state of the question; (iii) construction of theoretical referents; (iv) definition of the problem from conceptual and contextual criteria, and a systematic review is carried out, that is, a state of the question; (v) construction of theoretical referents, that is, a state of the question, a state of the question, and (vi) a state of the question.

-(iv) design and application of methodological instruments; (v) data treatment and analysis. For this article, moments one and two are presented and analyzed. Trajectories that are built at the moment when the postgraduate training course begins and that is crossed by a conglomerate of knowledge that is interwoven in the different training spaces, in fact, the role of the teacher-trainer is substantial in each of them. In this regard, Rico (2020) considers that

What is certain is that from the teacher trainer's point of view, the teaching intentions are centered on re-tracing practices, rewriting them. Their teachings will never be centered on forgetting and starting, what they want is for the teacher in training to re-reflect, to look inside and thus to situate him/herself in other places of his/her own practice. This is why training goes beyond the mere transmission of content (p. 73).

And this is reaffirmed by Vásquez (2011) when he states that

The challenge is to stop believing that our only task is to teach. Training goes beyond the transmission of knowledge. Knowledge is a pretext for bringing other forces to bear, for sculpting a character. The challenge is to discover the faces among the formless mass of students; it is to give a name to what we call the group or the semester (p. 29).

Design and application of methodological instruments

This moment focuses its attention on exposing some routes and methodologies implemented in the teaching of research in graduate programs, which have been designed along the trajectories of teacher training. Beyond the techniques and instruments implemented for data collection, means related to the dynamics of the projects and the places where they were developed were elaborated, however, they are accessible to all types of research, since what makes the researcher is not the technique, but the way he/she uses and understands the means, routes and methodologies he/she has. Among the main aspects for the design and application of methodological instruments are the following:

- a) The techniques implemented for the collection of information in the research process.
- b) Methodological instruments, which must be in accordance with the dynamics of the projects and the places where they are developed.
- c) The collection of sufficient and varied data, i.e. sufficient data saturation for better results.

Creswell (1994, p. 18) considers that the researcher "employs rigorous procedures for data collection, collects multiple forms of data, adequately summarizes the forms and details of the data, and spends adequate time in the field". While it is true that conducting fieldwork is a rigorous exercise, it can be simple to the extent that novice researchers have defined the context, the participants, and the most convenient theoretical and methodological routes to obtain the data.

Within this framework, one of the means used by the researchers was the *field diary*. In this regard, Vásquez (2011, pp. 170-171) says that the field diary is a "terrain of tension forces, as a space for reflexivity [...] the field diary is a useful tool for review".

This leads to the confirmation of the frequent use of this medium to obtain data in fieldwork. Thus, the researchers designed the diary -or as it is known in some scenarios as a *research log*- according to the needs of their research. A single format did not work for several projects; it was essential to adapt it to what was to be investigated and collected. It was the researchers who made this instrument [medium] more dynamic. Gibbs (2007, p. 49) states that "the field or research diary is a comprehensive document that includes day-to-day comments on the direction of data collection and thoughts, ideas and inspirations for subsequent analysis".

On some occasions - master work sessions of the Master's Degree in Education being discussed - it became evident that the teacher-trainers presented a standard format, however, with the advice and the formative exercise, the corresponding adjustments were made for each inquiry. Figure 6 shows the *field diary* in its original format.

Table 1. Original field diary format

| | | | |
|----------------------------------------------|-----------------------------|----------------------------|-----------------------------------------------------|
| Field diary No. | | | |
| Name and surname | | | |
| Date and place of preparation of the journal | | | |
| Type of observation | | | |
| Actors and/or context of the observation | | | |
| Account of the experience | | | |
| Observation of the fact or reality | Comments to the observation | Category in which it falls | Relationships with other categories (triangulation) |
| Observation analysis | | | |

Source. Own elaboration

Another of the *means* designed to strengthen investigative learning is called *pre-diagnosis*, used in the initial phase to intervene in the investigated context. It was designed by the teacher trainers so that the researchers -teachers in training- could make their first approaches in the places selected for research. This instrument was used by 10 working groups in different contexts to learn more about the characteristics, conditions and limitations of the selected educational institutions -in all cases, state institutions-. The original format of the *pre-diagnosis* is presented below. As with the *field diary*, it was adapted according to the researchers' intentions; in some cases, the questions and items were expanded, and in others they were modified. However, the intentionality of the instrument was not altered.

Table 2. Original pre-diagnosis format

| |
|------------------------------------------------------------------------------------------|
| Name of educational institution |
| Researchers |
| Teaching areas |
| Geographical location |
| Educational population |
| Teachers |
| Students |
| Managers |
| Parents |
| Institutional Education Project (PEI) |
| Curricular commitment |
| Pedagogical model |
| Evaluation models |
| How is the environment where the Institution is located? |
| Socioeconomic aspects |
| What conflicts impact on education, training, teaching and student and teacher learning? |
| Other data (awards, sports, parents' school, national test results) |

Source. Own elaboration

In summary, the researchers designed the most appropriate and coherent instruments for their research, which was a definitive step to consolidate the methodological means and instruments that favor learning in research, especially in actions such as diagnosing a context or situation, profiling possible participants, obtaining primary and secondary data, intervening in the contexts under investigation, data cleaning, among others. What has been seen so far is consistent with what Vásquez (2011, p. 167) states: "research, before being a learning of a set of techniques, implies a personal disposition, an attitude of suspicion towards the life that surrounds us".

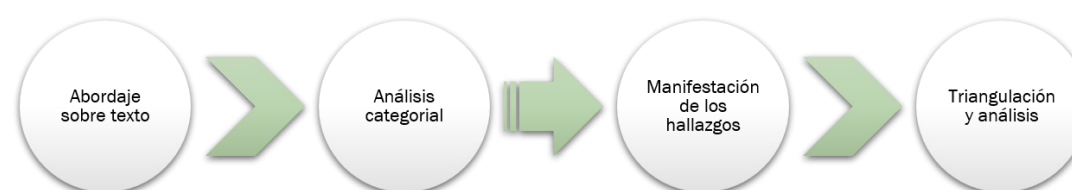
Data processing and analysis

The design and application of methodological instruments made it possible to see that the treatment and analysis of the data [depends] on the success of the adequate collection of data in the fieldwork. As Gibbs (2007) rightly states, in fieldwork data can be obtained in quantity, however, at the moment of undertaking the analysis,

it is necessary to start with the filtering and organization of information, and this process depends on the quality of the data collected and the time dedicated to its collection, as well as on the participants selected. It is necessary to consider that, when undertaking the analysis of the data, it is necessary to go back and review the objectives proposed in the research. This provides a holistic perspective of what was proposed, in addition, the researcher must already have a consolidated conceptual overview and articulated with what he has been working on so far, this allows him to establish solid, coherent arguments and constant openings for the interpretation of his results and research discussions (Hernández, et al, 2014).

Again Gibbs (2007, p. 28) says that it is unavoidable to have a prior conceptualization of the subject "what researchers often do is to deduce particular explanations from general theories and see if they correspond to the circumstances they observe". For this reason, the means, instruments, participants, contexts and ways of doing fieldwork acquire value and occupy a significant part in the work of the researcher in training.

Figure 1. *Data processing and analysis steps*



Source. Own elaboration

When recalling some of the research class sessions - in the master's degree in education, the object of study - it is found that the teacher-trainers generated instruments to teach the topic of data analysis, which becomes an optimal route for the researcher in training, which can be adapted to his proposed approaches and objectives. This research framework is called the *methodological route*, which allows the analysis of the data obtained in the fieldwork. This route has four steps, the first, *approaches to the text*¹, has to do with the transcription, reading, rereading and creation of data codes. These actions require time and dedication; however, what makes them simple is the quality of the data obtained in the fieldwork, the conceptual articulation of the data with the research, the use of methodological instruments, and the integration with the participants.

This first step alludes to working directly with the data already transcribed, in order to start the analyses according to the numerous readings. One of the three participating teachers refers to this step as follows:

From the problem statement and the guiding question, two categories of analysis emerged in the research process, from which categorical coding was carried out, based on the textual transcription of the stories and the in-depth interviews with the participants. In these, units of meaning were identified, which were assigned a code and subsequently linked to the corresponding category (Nelcy, April, 2018).

The second step, *categorical analysis*, is understood as the selection of textual paragraphs from the transcribed data to feed each of the categories of analysis of the research. Here, the teacher trainers designed a matrix for each research group to adapt to their project. In this regard, Gibbs (2007, p. 84) states that "analysis needs to move away from descriptions to a more category-focused, analytical and theoretical level of coding". In and of themselves, these categories are addressed in the theoretical foundations and at the time of analysis, the researchers-teachers-in-training-already have a theoretical background to categorize the data. Figure 7 shows the format of the initial analysis matrix.

¹. The names given to the steps are the product of research conducted by the author of this article.

Table 3. Original model of the initial analysis matrix

| | | | | | |
|--------------|-----------|----|----|----|----|
| | CATEGORÍA | C1 | C2 | C3 | C4 |
| PARTICIPANTE | | | | | |
| P1 | | | | | |
| P2 | | | | | |
| P3 | | | | | |

Source. Own elaboration

In the third step - the *manifestation of the findings* - the researcher-in-training performs a rigorous and careful analysis, i.e., he or she returns to the original data to review the findings in detail, to *find something new* among the data. Data that, thanks to the processing and analysis, are already grouped into pre-established categories. Here, it is a matter of *making the data speak*, that is, *to return* to the voices, to trace what is recurrent and novel. In the group where Nelcy and Pilar were, this step was assumed as follows: "the findings by categories of analysis allowed filtering the data collected to initiate a process of discovery, these emerged from the interaction of voices of the researchers and the participants" (Pilar, April, 2018).

The discovery of these findings opens the fourth step - *triangulation and analysis* - where the elements of the whole process are integrated and confronted: objectives, theoretical constructs, data obtained and the analyses and interpretations produced by the trainee researchers, "it is a strategy followed by the researcher to increase *confidence* in the quality of the data he/she uses" (Gibbs, 2007, p. 94). In this step, the teacher-trainers created two styles of matrix, to triangulate the data obtained and outline the analyses of these. Nelcy says that "in it, the voices of the interviewees, the concepts of the cited authors and the interpretation of the researchers were considered in a simple, coherent and understandable writing" (April, 2018). Table 2 shows simultaneously the two original formats of the matrix.

Table 4. *Triangulation and analysis matrices*

| Category | Research results | Fragments where the results are evident | Theoretical references that support the results | Relationship between research results and referents (analysis) |
|----------|------------------|-----------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Category | Actors | Voice contribution (data) | Contribution of epistemological and documentary contents (theoretical foundations). | Researchers' analysis: critical-reflexive and propositional stance (triangulation-analysis). |

Note: Own elaboration

Closing this first section of results on the construction of methodological trajectories for teaching research and the role of the teacher trainer, two pillars are considered: (i) creativity, related to the *ingenuity* of teacher researchers in training to do research and obtain coherent, argued and propositional results; and, (ii) the frameworks, related to the multiple ways of teaching research and the diverse methodological appropriations that circulate in the places of training. These networks become permanent openings and deposits for teachers and trainers -for the former, in their being, doing and doing; and, for the latter, in their experiences and consolidation of new teachings-.

Lessons learned in research: The voices of Sandra, Nelcy and Pilar.

The questioning of the configuration of postgraduate teacher training experiences is based on the lessons learned in research. In this sense, we present the analysis of three stories -those of Sandra, Nelcy and Pilar- who narrated their experiences of the training stage in a Master's Degree in Education, considering

the successes and difficulties that emerged during the course of the study, emphasizing research learning. In the three accounts, the need to initiate a postgraduate study to strengthen the professional and work environment was perceived (Vergara, 2017). The analysis made of these views and experiences was manifested in the training/practice relationship, considering that the teachers in training managed to make progressive modifications in their pedagogical practices.

One of the findings has to do with learning to search for scientific and investigative information, which, in most cases, the teachers in training did not have experience in tracking and purging specific information. Consequently, the teachers in their stories recovered these experiences that were configured in the different moments of their passage through the master's program and that were related to their teaching work. Aspects of this first finding were perceived in Sandra's account:

When I started searching for information related to the selected topic, I was surprised to find that there is a wide variety of texts, documents, articles, among others, and that in addition, there were several investigations that allowed me to be guided and thus be able to move forward with greater clarity on my project, but, at the same time, finding so much information, it was necessary to read a lot to have clarity on the subject and to specify the theories that supported my project. That is where I began to classify the most pertinent information. Although I had already defined the topic of my research, I did not know how to approach the participants, since I did not want them to feel "different" or like "guinea pigs". I had to find the precise way to make them feel at ease, confident and secure (April, 2018).

This fragment showed a *master's student* with the daily complications of her role, abundant information, lack of knowledge at the time of purifying and classifying it. However, she encountered another of the common problems in these scenarios, which has to do with field work, how to obtain information from the participants and how to ensure that it is accurate in order to fulfill the established objectives. In this way, the research lessons learned become meaningful for the master's degree students when they put them into practice.

Here emerges the capacity for questioning, criticality and reflexivity of the teacher to assume what has been learned and to be able to apply it in field work, although these lessons are also linked to their daily teaching and the ways of doing their job. Similarly, Nelcy reported that research learning became a personal challenge and a formative experience that transformed her work and allowed her to explore other alternatives to consolidate her teaching practices in the school setting where she works. Learning to do research provided her with better intellectual and professional conditions.

I consider my training as a researcher as a process -in general terms- as positive and satisfactory, initially I was very afraid, since I did not know my role and the tools to investigate, among other concepts and I believed that only great thinkers, the so-called "intellectuals" and great readers can investigate. I was afraid of disappointing myself, my family and advisors. However, I saw research as a challenge that I had to take on, since I always wanted to improve my academic and professional level. I had to learn how to do research to achieve this (April, 2018).

Indeed, it is not enough just to record content to teach, especially when it comes to a master's degree course; teachers who enter this level of training have previous experience and knowledge; they are also experts in making their discipline teachable and understand the meaning of the training received. Vásquez (2011) says that research "is a challenge to question what we already took for granted or had fully organized" (p. 150). This leads to say that the teacher trainer at the time of teaching is situated in common places, starting by investigating the consolidated experiences in the trajectories of teachers in training, which will allow him/her to generate research processes, reflective practices and analysis. In this regard, part of Pilar's account revealed one of the common difficulties among the teachers, which has to do with the consolidation of the problem to be investigated, a phase that requires greater formative accompaniment.

In this process the most difficult thing was to locate the problem, to understand what was really sought and what was to be achieved; also to delimit it to the time required by the university; another inconvenience encountered was to locate the people who wanted to collaborate, most were asked personally to collaborate, many did it willingly and others did not have the time to do it; some filled out the instrument conscientiously and others participated with very little information. Actually, in this process there were many fears related to the little information of the participants, with little time to dedicate to the research, with doubts about the process to follow and the fear of starting to write; there were discomfort, frustration, fatigue, doubts about whether they were doing the right thing (April, 2018).

It is evident that when a teacher in training is aware of the formative process he/she is in, he/she can acquire diverse contents and theories, methodological, pedagogical and didactic knowledge that allow him/her to *examine and recognize* his/her practices in order to relate them to what is happening in the training, because the formative process [teaching + learning] is shared and collegial.

Another finding had to do with the reading habits of teachers, which is a confrontation they face when entering a postgraduate training process. This finding would sound uncertain, but it is the reality that teacher educators encounter. In this regard, Sandra, in her account, expressed that the greatest difficulty she encountered upon entering the master's program was the approach to academic readings and their comprehension, because it is not a superficial reading but a deep and dedicated one.

My incursion into training as a researcher was a difficult process, since one of my strengths is not academic writing, but to this is also added my lack of interest in reading. Because of these cons, I felt that I was facing an impossible, something so big that it was out of my proportions (April, 2018).

In other accounts -obtained from the studies and inquiries carried out by the author-researcher in the teacher training macroproject- this was a frequent factor, the reading of academic texts on research are not easy to assimilate due to their contents -sometimes- *far* from the realities of what teachers in training do in their practices, linked, in addition, with the limited experience at the moment of undertaking a research at a master's degree level. The incursion into research was something new for most of the teachers, they were used to being classroom teachers, research had not been seen as an option for them, due to factors such as work time and the volume of daily work, for them, research required time, commitment and viable inputs with which to undertake a research. However, when they encountered other perspectives and views of research in the educational field, they realized that what they do in their daily lives could be turned into a research problem, and in this case, it was the starting point to undertake their degree project. And here, Nelcy reported that, at the time of entering into research learning, she confirmed the importance of generating a rigorous, academic and coherent work with her work. In this regard, she considers that

I had to do a "research" degree project, not so much an intervention... Oh no, more difficult, but I had to learn how to do research! The problem was that I did not know how. Faced with this reality, the research seminars proposed by the university were of great help and determinant to start the production of new knowledge, the way of approaching the research process that the advisors transmitted made this process understandable, accessible and less "monstrous" (April, 2018).

Transiting through a postgraduate study leads to see practices and work from another angle, research practices are involved in the daily life of the teacher, so that it is from these common places that processes of inquiry are initiated and incorporate reflective practices of doing and being as a teacher (Vergara, 2018). Nelcy, Sandra and Pilar at the beginning had many fears in front of the development of investigative competencies, even in the process to understand research, study habits was the first thing that was adapted in their daily work. The same happened with the habits of specialized readings, the elaboration of summaries, analytical cards and mental maps for the formulation, development and execution of the thesis project.

In the specific case of the teachers' narratives, "the constant need to narrate what was experienced in the training scenarios as master's degree in education was reflected, to put in the tapestry general experiences with a certain degree of significance and that could characterize the specific ones of the formative event" (Rico, 2020, p. 104). From the narratives of the teachers, one of the most influential processes in their training as teachers were the teachings of research practices, related to the methodological forms, approaches, techniques, methods and postures applied in educational scenarios. Regarding the shaping of the investigative learning Pilar in her account said that "for us the exercise of reflecting on our practice was what made us investigate it and undertake research, because otherwise we would continue to be common teachers and that is not the idea" (April, 2018).

However, Sandra, although she was the teacher who had the most difficulties to get involved in the research process, she realized that, having read about the subject, she was organizing her ideas and discovering that

Knowledge is built in practices, in my classroom, in my context and this *generated* a great change in the perception I had as a teacher, who literally came to teach. Three semesters later I realized that it is another way, not only in teaching but in learning, that my students need to have (April, 2018).

To conclude, in the research process there is a strong relationship between the student, the school, the teacher and what he/she has managed to build in his/her work place, since this becomes the great platform where a variety of learning acquired through experience and linked to the teacher training processes interact, the more the practice is investigated, the more the critical positions of the practice are increased in order to strengthen it. In addition, the knowledge acquired not only generates certainties but also uncertainties about what is taught, i.e., teachers are exposed to recognize their practice from learning and unlearning (Alliaud and Antello, 2011). *Other* research knowledge acquired in postgraduate training and combined with teaching practices includes the collection, selection and organization of information, knowledge of theories, analysis and exploration of a certain field of knowledge, which lead to a better understanding of the teaching profession and propose other places to generate research.

Discussion

Methodological trajectories are discovered in the training process, that is, they are organized by the training teachers, taking into account the moment of the process and the forms of appropriation of the novice researchers. This means that these trajectories are part of a plot made up of: (i) the teaching of research, asking what it is and how it is researched; (ii) the tracking of the problem to be investigated, asking why and why we are interested in researching it; and (iii) the documentary search on the problem and the categories that go through it, asking what interests us about what we want to investigate and how it is going to be investigated. It is quite possible that there are other aspects that may be part of this plot, however, the methodological trajectories can be understood as the study of the methods to carry out the research.

On the other hand, this study on the routes and methodologies created and implemented by teacher educators to teach research begins with an understanding of the epistemological foundations on research, addressing various positions on the subject. In other words, learning and its *uses* are defined on the basis of a consensus between teachers in training and teacher educators; it is the latter who lead the former to reflect and act on their process as researchers. In other words, it is the construction of a dialogue between two parties for the conformation of new plots in terms of research. Research is the central axis of postgraduate teacher training; however, it is not a matter of the teacher being a researcher and abandoning his/her profession, what is expected is that the different places of training allow research to be assumed as a means or route to configure and rethink the experiences as a teacher. That is, other scenarios are conceived to problematize, reflect and transform pedagogical practices (Martínez, *et al*, 2015).

Thus, postgraduate teacher training is an emancipating place, to the extent that the teacher in training and the trained teacher are impacted, opting for a critical and interdisciplinary view of the different educational and training contexts, so that both parties reflect and resignify what happens in their practice, strengthening their profession and teaching-investigative character. In the words of Martínez, *et al* (2015, p. 64) "the teacher when he/she finds and gives meaning to his/her work, as he/she assumes the challenge of seeing teaching as an opportunity to help, guide and accompany the other". Teacher training is presented as a field of permanent transformations that raise research and theoretical-practical revision of the task and the formative-pedagogical experience.

In training scenarios, particularly with primary and secondary education teachers, all new knowledge is valuable for their practice and professional work, which is why the act of teaching to research becomes a dialogical act that is constituted from the practice and appropriation that each research group has on what it researches. The routes and methodologies in research, beyond being based on theories, make sense in the process that each teacher in training carries out from the reflection and appropriation of new knowledge.

Finally, teacher training becomes a commitment for the teacher trainer, to the extent that it is not about making a *collage* of theories on research, but to experience it, that is, that those who are being trained in a postgraduate studies scenario undertake their research from what they do, from an exercise of observation, analysis, reflection and re-signification of what happens in their work. It is at this point where *formative trajectories* are shaped (Rico, 2020), which are constructed from two places: (i) a personal perspective of the teaching task; and (ii) the ability to appropriate the knowledge and know-how provided by the teacher educators. Teachers who continue their training transform their perception of research and include it in their classroom practices, recognizing their work and focusing on the continuous improvement of their work (Vergara, 2017).

Conclusions

Upon inquiring about postgraduate teacher training, it was revealed that research is a necessary element to reflect on teaching practices, generating other sources of analysis and consolidating new strategies for teaching and acting in school scenarios. This aspect is related to the self-reflection and criticality that teachers develop both in training spaces and in school scenarios, that is, in their daily life as teachers and the way they practice (Vergara, 2017).

On the other hand, the dialogic spaces between teachers in training become an exercise that makes a difference for their contributions and questioning that can be given on the work of each one, based on the sharing of knowledge, good practices, experiences and moments of collegial training, which are involved with what has been learned in the processes of postgraduate training (Vergara, 2017). In this way, it is that the research practices that are conceived from the teaching task allow meaning in *other ways* what is done, that is, to be able to involve other knowledge, knowledges and experiences to be shared in the spaces of dialogue. Considering that these new forms of meaning propose teaching practices in accordance with the students' contexts and lead to situated learning (Edelstein, 2013).

From the formative and professional point of view, an understanding of the research field was identified to improve teaching practices, Vásquez (2011) calls it "renewing the profession", an alternative with which teachers in training can start to do research from their own practices. Thinking about teacher training from the practices of reflection and research and not only from disciplinary knowledge but also from doing and being a teacher, refers to other pedagogical, didactic and evaluative positions, which are partly defined in the research practices and from the teaching work in a reflective, critical and proactive plane of pedagogical action. This means that training places are integrated with reflective and situated practices (Edelstein, 2013).

In the stories analyzed, it was deduced that the challenge of problematizing pedagogical experiences, starting from the production of knowledge, can generate *other relational modes* with power and act from the professional dimension. In other words, "a teacher who enters a master's or doctoral program has the challenge of problematizing his/her pedagogical experience from three dimensions: producing knowledge; producing other ways of relating to power; and affecting his/her own subjectivity" (Martínez, *et al*, 2008, p. 67).

A final conclusion of this study and in particular of the category presented in this article -investigative learning-, is that the practices already rethought (Bain, 2012) are configured from the empowerment and new perceptions of the work that is generated with the acquired training, configuring *other ways* of seeing being and doing as a teacher, allowing the incursion of new proposals and teaching and research practices in the school scenarios where teachers in training work, making possible the flexibilization of what was considered true and immovable.

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