



Shared Teaching in Pre-Service Education of Mathematics Teachers: Identity and Alterity

Docência Compartilhada na Formação Inicial de Professores de Matemática: Identidade e Alteridade

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Abstract

The context of this paper is thimplementation of a proposal of shared teaching with a School teacher and a University lecturer, in a module of the undergraduate program for mathematics teachers' pre-service education at the Federal University of Rio de Janeiro (UFRJ). The experience is part of the Shared Teaching Practices research project (PDC), of the Laboratory of Mathematical Practices of Teaching (LaPraME), a research group linked to the Graduate Program in Mathematics Education at UFRJ (PEMAT-UFRJ). We focus on aspects of teachers' professional identity that emerge from the interactions between the actors involved in the shared teaching experience, seen from the perspective of the dynamic relationships between identity and alterity. The methodology involved the production of qualitative data through written records in the form of personal logs, with the reflections on the lessons by each of the teachers, analyzed trough the theoretical lenses of symbolic interactionism. Our results indicate the practice of empathy and the sense of belonging as aspects emerging from shared teaching.

Keywords: Teachers' Professional Identity; Alterity; Shared Teaching; Pre-service Mathematics Teachers Education.

Resumo

Este artigo tem como contexto a implementação de uma proposta de docência compartilhada por um professor da Educação Básica e um do Ensino Superior, em uma disciplina do curso de Licenciatura em Matemática da Universidade Federal do Rio de Janeiro (UFRJ). A experiência é parte do projeto Práticas Docentes Compartilhadas (PDC), do Laboratório de Práticas Matemáticas do Ensino (LaPraME), grupo de pesquisa vinculado ao Programa de Pós-Graduação em Ensino de Matemática da UFRJ (PEMAT-UFRJ). Enfocamos aspectos da identidade profissional docente que emergem das interações entre os atores envolvidos na

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experiência de docência compartilhada, observados a partir das relações dinâmicas entre identidade e alteridade. A metodologia utilizada envolveu a produção de dados qualitativos por intermédio de registros escritos em forma diários individuais, com as reflexões de cada um dos professores sobre as aulas, analisados sob a lente teórica do interacionismo simbólico. Nossos resultados indicam a prática da empatia e o sentimento de pertencimento como aspectos emergentes da docência compartilhada.

Palavras-chave: Identidade Profissional Docente; Alteridade; Docência Compartilhada; Licenciatura em Matemática.

Introduction

Discussions on teachers' education are at the core of the educational debate. The contemporaneity brings new demands to society and individuals, and inevitably to the teaching profession. As highlighted by Cyrino (2015, p. 2),

The education of teachers who teach mathematics is a complex process that involves the interaction of several aspects, such as: mathematical knowledge; knowledge about mathematics teaching; teachers' professional identity; knowledge, expectations, conceptions and interests of prospective teachers; characteristics of teachers' educators and other program participants; purposes, forms of assessment, curriculum, pedagogical approaches and organization of the program; sociocultural characteristics of society, organization of the educational system, research, among others. (Cyrino, 2015, p. 2)

In this paper, the relationships between the concepts of **identity and alterity** are addressed in a dialogical way, integrated into the broader scenario of theories about the constitution of the **teachers' professional identities**. The research was developed in the context of the implementation of a shared teaching proposal, in which two teachers – one from the School and one from the University – worked together in a module of the undergraduate program for mathematics teachers' pre-service education at the Federal University of Rio de Janeiro (UFRJ). We describe and analyze constituent aspects of teachers' professional identities that emerged in this context, pointing out elements already described in the research literature and proposing others, specifically connected with the social construction of identity and alterity.

Teachers' Professional Identity

Our arguments are aligned with the specific literature that understands identity as a process, both in the personal and professional spheres, characterized by being fluid, non-linear, in constant modification and continuous (re)construction (e.g. Dubar, 2006; Nóvoa, 1992; Silva, Aguiar & Monteiro, 2014; Cyrino, 2015; 2016). Dubar (2006) presents two currents related to the notion of identity: the essentialist and the existentialist. In the essentialist current, the conception of identity “rests on the belief in ‘essences’, in essential realities, in substances at the same time immutable and original” (Dubar, 2006, p. 7, emphasis in original). In opposition, the current defended by the author is the existentialist, a conception of identity in which “there are no essences, but contingent existences” (ibid, p. 9). In the existentialist perspective,

[...] identity is not that what remains necessarily “identical”, but the result of a “contingent identification”. It is the result of a double linguistic operation: differentiation and generalization. The first aims at defining difference, that which makes someone or something unique in relation to something or someone else: identity is difference. The second one seeks to define the common point of a class of elements all different from each other: identity is common belonging. (ibid, pp. 8-9)

In the professional scope, Dubar (2006, p. 85) considers that “professional identities are socially recognized ways for individuals to identify themselves with each other in the field of work and employment”. Considering that each profession has its specificities, we will now deal specifically with teachers’ professional identity. Garcia, Hypolito & Vieira (2005, p. 54) argue that teachers’ professional identity is

[...] understood as a social construction marked by multiple factors that interact among themselves, resulting in a series of representations that teachers make of themselves and their functions, establishing, consciously and unconsciously, negotiations that certainly include their life stories, their concrete working conditions, the recurring imaginary about this profession – certainly marked by the genesis and historical development of the teaching function – and the discourses that circulate in the social and cultural world about teachers and school.

Teachers’ professional identity, understood as a social construction, emphasizes the broader conception of identity as a process, whilst the multiple factors that interact in this construction emphasize the non-linearity of the concept. Among these multiple factors that constitute the process of (re)construction of the teachers’ professional identity, in this paper we are particularly interested in those directly linked to the teaching practice.

For Cyrino (2015), teachers’ professional identity is understood as

[...] a set of interconnected beliefs/conceptions and knowledge about their work (content knowledge, pedagogical knowledge, curriculum knowledge, and understanding about the structure of the discipline and classroom related practices) associated with autonomy (sense of vulnerability and agency) and political commitment. (Cyrino, 2015, p. 3)

The author points out five aspects of teachers’ professional identity that were highlighted in Cyrino (2016), namely: self-knowledge; beliefs and conceptions; professional knowledge; vulnerability; sense of agency and political commitment. We present Cyrino’s understanding of the aspects of vulnerability and sense of agency, which have meanings different from common sense. She highlights that the vulnerability of the teachers’ professional identity is not associated with senses of weakness or fragility,

[...] but one that allows us to suspend our certainties and convictions for a few moments, longer or shorter, and more or less frequently. That one which makes us question ourselves. Also, the vulnerability in the sense that we expose ourselves to others and, as such, we can become “targets of criticism, of contestation”. (Oliveira & Cyrino, 2011, p. 112).

The sense of agency, on the other hand, refers to the actions necessary for teachers to have opportunities to develop knowledge to overcome difficulties and limitations (Cyrino,

2015, pp. 3-4). Besides the five aspects of teachers' professional identity highlighted by Cyrino (2016), different ones may emerge in other research contexts, provoking new reflections in the research literature on teachers' professional identity.

This work is situated in the context of interaction between two teachers in a module of the undergraduate program for mathematics teachers' pre-service education at the Federal University of Rio de Janeiro, involving all the aspects identified by Cyrino (2016) and, in addition to those, elements linked to the identities and consequent alterities experienced by the two teachers. In the next section we will present our approach to the concepts of **alterity** and **identity**. The theoretical positions of both concepts, as well as the articulations with the perspective proposed by Cyrino (2016), are necessary for the sake of clarity of our approach.

Alterity and Identity

The concepts of identity and alterity are intertwined. Dubar (2006), in defending the existentialist current for the understanding of identity as a double operation – differentiation and generalization –, argues that:

These two operations are at the origin of the paradox of identity: that which is unique and that which is shared. This paradox cannot be resolved without taking into account the element common to both operations: the identification of and by the other. From this perspective, there is no identity without alterity. Identities, like alterities, vary historically and depend on their context of definition. (Dubar, 2006, p. 9)

In consonance, Silva, Aguiar e Monteiro (2014, p. 739) argue that “[...] in a process of identity constitution, the forms of identity are inseparable from social relationships, which are also forms of alterity; that is, there is no identity without a relationship between the self and the other”. Thones e Pereira (2013), when discussing the nature of what is strange, the other, in order to reflect on the problem of alterity in education, note that

The task is difficult to accomplish – however, not impossible – as the concept is pendular, relative, and relational; oscillating between, on the one hand, a feeling, an affection, and on the other, the representation of the self in relation to the other. Here, the stranger constitutes a mined territory, or rather, a deterritory. (Thones & Pereira, 2013, p. 502)

The “representation of the self in relation to the other” (ibid) is part of the permanent dynamic between identity and alterity, since the self and the other assume alternating positions in an interaction, in a continuous exchange of referentials. That is, for the other, the other is the self. In this way, as well as the self and the other, identity and alterity coexist and the existence of one affirms the existence of the other. According to Orso (2016), “[...] we can infer that our constitution as an ‘other’ passes, essentially, through a process of positive or negative identification with others. It is like admitting or refusing the other that exists in us.” (Orso, 2016, p. 186). Still on the other, Oliveira argues that

The other, the one who has different beliefs, values and forms of behavior, is, at the same time, a denied identity and an identity that denies the standards conventionally accepted as legitimate. [...] The other questions and judges, at every moment, what we are, our beliefs, our ways of acting, as we proceed in relation to them. (Oliveira, 2009,

p. 423)

The relationships between the other and the self, of a questioning, reflexive, and interdependent nature, only come about through the encounter, in a context of interaction. For Laplantine (2003),

The experience of alterity (and the elaboration of this experience) leads us to see that what we would not even have been able to imagine, given our difficulty in fixing our attention on that what is habitual, familiar, daily, and which we consider “evident”. We slowly notice that the smallest of our behaviors (gestures, mimics, postures, affective reactions) do not comprise anything really “natural”. We then begin to be surprised by what concerns ourselves, to spy on us. The (anthropological) knowledge of our culture inevitably passes through the knowledge of other cultures; and we must recognize especially that we are one possible culture among many others, but not the only one. (Laplantine, 2003, pp. 12-13)

Our arguments are based on a fundamental assumption. We understand that the teaching at School and at the University takes place on rather different and, sometimes, even divergent cultural scopes. Being a lecturer at the university is not the same as being a school teacher. There is a kind of positional stratification in the teaching profession, which tends to value teaching at the university to the detriment of school teaching. This stratification is reflected in aspects such as income levels, classroom workloads, and social legitimacy of the profession, among others. Besides all these aspects, university lecturers are thought of as the main educators of school teachers, which presupposes several hierarchies, including on levels of knowledge. The Shared Teaching Practice (PDC⁴) project is a pedagogical action that challenges this imaginary about teaching at school and at the university. By placing two teachers in the same classroom, both responsible for the same module, representations of both professional identities are necessarily tensioned and dynamics of alterity emerge.

Shared Teaching Practices

The PDC project was conceived, structured and implemented in the Laboratory of Mathematical Practices of Teaching (LaPraME), a research group linked to the Mathematics Education Graduate Program at the Federal University of Rio de Janeiro (PEMAT-UFRJ). The PDC Project proposes conducting curricular modules in a shared teaching format by two or more teachers (e. g. Giraldo et al, 2016; 2017; 2018; Melo, Giraldo & Rosistolato, 2020a, 2020b), in which teachers are expected to share all stages of the module, including preparing and conducting lessons, planning assessments and so on.

The PDC Project started with a pilot study in the first academic semester of 2015 (Giraldo et al, 2016). In the second semester of the same year, there was the first full implementation, which was defined on the basis of the original proposal and the results of the pilot. Our data come from the monitoring of this implementation in a module on Foundations of Arithmetic and Algebra, of the undergraduate program for mathematics teachers’ pre-service education at UFRJ.

⁴ Initials from the term in Portuguese: Práticas Docentes Compartilhadas.

Methodological Path

The data used in this paper were produced with the participation of LaPraME members, who took turns in observing lessons and mapping out data in the implementation of the PDC Project in the module on Foundations of Arithmetic and Algebra throughout the second academic semester of 2015. Different data production instruments were used, being organized in three stages:

- iii. Before the beginning of the module: two focus groups with undergraduate students enrolled in the module.
- ii. During the module: written logs of joint planning by the two teachers; personal written logs by each teacher, made right after the end of each lesson; lesson observation reports, produced by two independent observers; video recordings of the lessons; written material produced by the participant undergraduate students in the activities proposed in the module.
- iii. After the end of the module: collective interview and individual questionnaires with the participant undergraduate students.

The data production was conducted over all 16 lessons that took place during the semester, each one four hours long, in addition to the meetings before and after the end of the lessons, referring to the focus groups and collective interview, respectively. The questionnaire was made available virtually to the undergraduate students. Out of the 16 lessons, 12 were conducted with the presence of both teachers, 2 lessons with the presence of Victor only (university lecturer), and 2 lessons with the presence of Fábio only (school teacher). The initial guideline was that all the lessons would be shared by both teachers, but the absence of one or the other in some ones was due to personal reasons⁵.

In the shared teaching experience analyzed in this paper, there was no rigid planning to divide the lessons into specific moments of participation for each of the teachers. The lessons were collaboratively planned by both teachers, contemplating the subject matter and objectives of each session. The dynamics of the lessons flowed according to the demands that emerged in the context of the interactions between teachers and students.

The results presented in this paper are based on data from the records in the personal written logs of each teacher, with reflections on the taught lessons. Other parts of the data produced from the instruments listed above were used in other works on the implementation of the PDC Project (e. g. Giraldo et al, 2017; 2018; Melo, Giraldo & Rosistolato, 2020a, 2020b). The organization and systematization⁶ of the data were guided by the following

⁵ All undergraduates were informed that the module was also a research project and were invited to participate. There was no resistance to participation. On the contrary, the undergraduates expressed approval and interest in the project. After the general presentation of the research activities to be carried out, everyone signed a Free and Informed Consent Form, which was filed by the study's coordinator, after the conclusion of the fieldwork.

⁶ We selected ten lessons with episodes that we considered relevant for analysis purposes, according to the aims of this work. In each lesson, we cut out excerpts of the data guided by the four questions presented in this

questions:

1. What does each one say about himself?
2. What does each one say about the other?
3. What does each one say about the interaction?
4. What does each one say about the lessons?

The teachers who participated in the experience of shared teaching that we analyze in this paper are: Fábio (school teacher) and Victor (university lecturer). Both are members of the research group LaPrAME and also creators of the PDC Project. During the entire period of data production, a protocol was adopted according to which the two teachers and the other researchers participating in the Project would not share with each other the records made in the personal logs or in the lesson observation reports.

The data are analyzed according to the theoretical perspective of symbolic interactionism, sociological approach which assumes that meanings play a central role in the dynamics of interaction between individuals. The product of social interactions is continuously constructed and reconstructed, and the meanings attributed by the actors involved in the interaction are put under negotiation throughout this process. Symbolic interactionism is structured upon three basic premises, presented by Blumer (1986):

1. Individuals act towards things based on the meanings assigned to those things.
2. The meanings of such things are derived from, or arise from, the interactions the individual has with others.
3. Meanings are dealt with and modified through an interpretive process of the individual in interaction with things.

From an interactionist perspective, the social outcome resulting from interactions is greater than the simple sum of what each of the interacting parties would have to contribute in isolation. Such outcomes have their own characteristics, the result of interpretative processes in the dynamics of interaction. Thus, by looking at the research data with an interactionist approach, we aimed to contemplate the breadth of the interactive process in the shared teaching experience, focusing on the permanent dynamic between identity and alterity.

Identities and Alterity in the Classroom

section, in relation to each of the teachers. Thus, the systematization of the data generated a table with a considerably large data load, which would not fit into the body of this paper. We chose to bring specific pics of data along the analysis, illustrating the presentation of the research results. The full table with the systematization of the data is available in the first author's doctoral thesis, supervised by the othr two authors of this paper, and can be accessed through this electronic address: http://www.pg.im.ufjf.br/pemat/DSc%2013_Lucas%20Medeiros%20e%20Melo.pdf

As Dubar (2006) states, “there is no identity without alterity”. Supported by this premise, we explore the dynamics between identity and alterity in the shared teaching experience. In this paper, we use the results presented by Cyrino (2015; 2016) as a theoretical frame for data analysis, together with our panoramic understanding of the shared teaching experience as a research subject, which we have built throughout other works developed in the same context (e. g. Melo, Giraldo & Rosistolato, 2020a, 2020b).

In general, the constituent aspects of the teachers’ professional identity highlighted by Cyrino (2015; 2016) – self-knowledge, beliefs and conceptions; professional knowledge; vulnerability; sense of agency and political commitment – were also observed in the dynamics of interactions between the two teachers in the shared teaching experience. In addition to these aspects, in order to establish articulations with the conceptualization of teachers’ professional identity proposed by the author, we sought to identify other factors that may emerge in our research context.

According to our analysis, in the shared teaching experience analyzed from the point of view of the dynamics between identity and alterity, with regard to the development and (re)construction of teachers’ professional identities, two other aspects emerged: **practice of empathy** and **sense of belonging**. The aspect of **practice of empathy** and **sense of belonging** emerged, respectively, from the analysis of Victor’s and of Fabio’s reflections.

In this paper, we refer to the notion of empathy⁷ beyond common sense. In the context of teaching, we consider that the ability to practice empathy does emerge as a welcome quality to teachers only as a characteristic inherited from their more general character as an individual. We understand empathy as an aspect that is presented for epistemological

⁷ In anthropological theory, there is extensive debate about empathy and belonging. For the limits of this paper, it would not be possible to carry out an exegesis of both concepts, indicating their interrelations with phenomenology and symbolic interactionism, but it is worth pointing out the definitions from which we depart. We understand empathy as a fundamental element of the intersubjective relationships developed during fieldwork. Researchers in observational fieldwork need to immerse themselves in the categories of thoughts and feelings present in the group in which they are inserted, so that they can understand and feel the world based on the perspective of the researched group. This methodological path has been present in anthropological theory since the seminal work of Malinowski (1980). Belonging is directly related to the feeling of being in a social group, with clarity about the symbolic boundaries of this group in relation to others, and clarity about the individual and collective bonds present in this relationship. The debate about belonging is also inherent to the anthropological approach so that any researcher who intends to develop an observational research needs to understand the boundaries and the dynamics of the group researched in order to analyze its elements of belonging and all the interactions developed within the group. For the debate on the analysis of social group belonging, among other references from which we started, it is worth mentioning the works by Foote-Whyte (2005) and Valladares (2007), but as we pointed out, it would not be possible to scrutinize all the ramifications – identities, belonging, dislocations, interethnic relations, community belonging, among others – of this debate in sociology and anthropology in the space of this text.

MALINOWSKI, Bronislaw. Object, method and scope of this research. In: GUIMARÃES, Alba Zaluar (org). *Desvendando Máscaras Sociais*. Rio de Janeiro: Francisco Alves Editora, 1980.

FOOTE-WHYTE, William. *Sociedade de esquina: a estrutura social de uma área urbana pobre e degradada*. Rio de Janeiro, Jorge Zahar, 2005.

VALLADARES, Lícia do Prado. The ten commandments of participant observation. *Rev. bras. Ci. Soc.*[online]. 2007, vol.22, n. 63, pp. 153-155. ISSN 0102-6909. <http://dx.doi.org/10.1590/S0102-69092007000100012>

purposes in relation to the exercise of teaching as a professional activity. Educational processes cannot happen independently of other individuals. For teachers' professional acting, a broader understanding of the sociocultural contexts in which the educational processes are situated is fundamental.

In the same way, the sense of belonging is associated with the idea of being inserted, of being part of something or some place. In this work, it is important to place this sense in a constructive dimension, that is, a belonging linked to something whose construction individuals themselves participated in, and not only something they got appropriated of in a participative way.

The shared teaching experience was monitored by mixed methodologies, with highlight on each teacher's perspective on the one hand, and on the interactions between them on the other. We considered important to value the interactions, but also the subjective issues experienced by both teachers during the process. In the sequence of the text, our focus will be directed to the analysis of the subjective aspects reported by each one of them. As we will describe, the school teacher, in his personal log, emphasizes a number of issues connected to his progressive sense of belonging to the broader identity of school teachers' educator, whilst the university lecturer reports specificities of the empathy processes he experienced during the sessions. We do not intend to put together a mosaic of the interactions developed by both teachers along the reported episodes, but to deepen into their subjectivities and the effects of the shared teaching experience in their professional practices, based on our analysis of the individual reflections of each one. Therefore, the narratives on the subjectivity of the school teacher are marked by aspects of sense of belonging, whilst those presented by the university lecturer are marked by aspects of empathy.

The practice of empathy and teachers' professional identity

In the shared teaching experience, the change in relation to conventional classroom models is basically the presence of a second teacher, and the fact that the latter is not usually assigned the role of school teachers' educator, since he is a school teacher himself. This issue occupies a place in Victor's reflections, in attention to Fabio's participation in the shared teaching experience. In his records on the first lesson already, Victor points out

Victor (Lesson 1): *We still have to work a lot on Fabio's participation in the lesson. On this first day, I am still dictating the rhythm and content of the lesson, and he is in a peripheral position, which is even evident in the physical organization of the classroom: he sits near a corner of the room, while I am on the board in the center of the room.*

In Melo, Giraldo e Rosistolato (2020a), we pointed out the hierarchical relations between teaching positions in universities and schools, with higher valorization of the former over the latter. We claimed that this established hierarchy was counterproductive, since the PDC format presupposes precisely the fluctuation of hierarchies. It is assumed that the two teachers should share all dimensions of classroom practice and of their relationships with students. Victor's reflections indicate empathy, in the sense of taking into consideration the hierarchical issues posed, and being aware of Fabio's role in the shared teaching. In the

records on Lesson 4, Victor highlights:

Victor (Lesson 4): *In general, I think that, in this lesson, Fabio had more initiative and the participation was more balanced than in the other lesson we gave together, but I think that the hierarchy is still clear. So, we still have to work on this.*

An example of the practice of empathy can be observed in Lesson 6, when there was a difference of opinion between the two teachers regarding the association between word meanings in the mother tongue and in mathematics.

Victor (Lesson 6): *Today, Fabio said something that I don't agree with (or at least that we have to be careful about): that associating the meaning of the name of a mathematical term in the mother tongue helps to understand its mathematical meaning. Indeed, in the examples he mentioned, such as "numerator and denominator", this is true. However, as mathematics education research literature points out, in other cases, such as "limit" (typically), the association with the mother tongue can be a obstacle to learning. Therefore, we cannot generalize that statement. In other cases still, the mother tongue meaning is innocuous, as for example in the case of "ring", which appeared in the lesson later. At the time he said it, I observed that one has to be careful about this, but I chose not to be too emphatic. Later, I will talk to them about it.*

In avoiding the conflict by choosing not to emphasize the disagreement, Victor takes hierarchical issues into consideration, with the intention of not delegitimizing the figure of the school teacher in that situation. In the context of the interaction dynamics between the two teachers and the undergraduates, the meanings about hierarchy and shared teaching have a determining role in Victor's action, who acted with empathy by trying to avoid conflict.

In the interaction dynamics, empathy represents an aspect that creates bonds between the two teachers, composing an identity in opposition to the counterproductive alterity of hierarchical relationships. Fabio himself perceives this aspect, as evidenced by the following excerpt from his log on Lesson 10:

Fabio (Lesson 10): *My posture in front of the class is more natural. Victor makes it easier!*

Fabio does not explain in which way Victor contributed to his change of posture in front of the class. However, in our analysis, we interpret this aspect as a result of the interaction through the empathy aspect. Besides that, we highlight Victor's reflective posture, reported in his log, in problematizing the role of each one of the teachers in the shared teaching and the potentialities of this format for teacher education:

Victor (Lesson 1): *I think that this experience (and, in particular, the writing of these accounts) will help me to better understand some practices that I have already adopted, kind of intuitively, and consequently, to improve those practices.*

Victor (Lesson 6): *This experience (and the writing of the reports) is helping me to organize and ground my own practice.*

Victor (Lesson 11): *The relevance of this module, the importance of the PDC format, and Fabio's participation have become very clear to me. There are some things he says that I would never be able to say by myself, so some of the discussions just wouldn't happen. Clearly, these discussions get the students to think about things they have never thought about before, things that are often not so much discussed in undergraduate courses, and to have new insights into these things.*

We highlight an excerpt from Victor's reflections on Lesson 15 that refer to the quality of debate in lessons in the PDC format.

Victor (Lesson 15): *It is also clear how important this quality of debate is for my own professional education (education of the educator). It is already clear that this quality of debate helps me to understand "concretely" the role of the knowledge that emerges from practice (which is brought about by Fabio). Moreover, these discussions make me understand from another perspective how students produce meaning for things, because the separation between me and them is smaller, and I am always putting myself closer to their place.*

The quality of the debate is a result of the interaction of several factors, among which the knowledge emerging from practice brought by the school teacher, Fabio, stands out. The dynamics of interactions in the PDC format affects Victor's identity as a teachers' educator, from the alterity of Fabio's knowledge of practice. The dynamic relationship between the concepts of identity and alterity is illustrated in the previous excerpt.

Moreover, this last account also illustrates our understanding of meaning production from the perspective of symbolic interactionism. For Victor, the discussions in the PDC format promote a closer relationship between teachers and undergraduates, constituting an interactive process that affects the way undergraduates produce meaning for things.

Sense of belonging and teachers' professional identity

One of the obstacles observed in the process of implementation of the shared teaching format lies in the lack of protagonism from Fabio in the initial moments of the module (Melo, Giraldo & Rosistolato, 2020b). However, Fabio's participation gradually became more autonomous and naturalized throughout the semester. We will now analyze this gradual change in the quality of Fabio's participation, focusing on the dynamics between identity and alterity in the construction of his sense of belonging as a teachers' educator. In his reflections recorded in the personal log, Fabio himself reports the lack of protagonism observed.

Fabio (Lesson 1): *I placed myself as a trainee/student. I sat in the corner and started to take my notes. But, little by little I was "intruding myself" in the lesson. For the rest of the lesson, with continued observation of the students I was gaining confidence and participating by looking more directly at the students. I don't know if they see me as their teacher.*

The above account illustrates the strangeness, in the beginning of the shared teaching process, the novelty being implemented. The initial feeling is of insecurity. In the account of Lesson 4, we observe that the interaction with the students dilutes Fabio's insecurity.

Fabio (Lesson 4): *The normality with which they ask me questions and report back to me has made me take another place in the room: next to Victor, in the frontal position between the board and the students. [...] I feel, however, that this format tends to be attractive for both the students and to me because Victor and I have a great relationship and are willing to learn from each other. This also gives me a lot of autonomy to also not be afraid to make mistakes.*

We also observed a reflective posture of Fabio in relation to the shared teaching format, when he considers that the experience is attractive for him and for the undergraduates, attributing such perspective to his good relationship with Victor and to the willingness of both to learn from each other. By using the expression "good relationship",

Fabio qualifies positively a form of interaction between identities and alterities in the process of shared teaching, which directly affects his identity as a teacher, since he associates this aspect with his teaching autonomy. In his account of Lesson 6, Fabio reflects on how his participation gradually became more natural:

Fabio (Lesson 6): *I am already starting to place myself in front of the class, I believe they already see me as part of their education. This was the lesson, so far, with the greatest “partnership”/participation from me.*

One of the factors that constitute the process of constructing the sense of belonging by Fabio is the alterity in relation to the idea of acceptance by the undergraduates. Fabio begins to identify himself as an educator of teachers, insofar as he interacts with the feeling of “being accepted” as a teacher by the students. His account of Lesson 7 also illustrates this analysis:

Fabio (Lesson 7): *The participation of students asking directly to me increases every day. Victor never leaves me out of any theoretical question. He also asks his students to think about the issues. In a more expository and theoretical lesson, my participation decreases, which made possible some real-time notes in this document. But, still, I consider my presence quite important.*

The way the shared teaching experience affects the reflections on the teachers’ professional identity is made explicit in Fabio’s records of Lesson 8:

Fabio (Lesson 8): *I feel that this experience has been very good, specially for me. I have the opportunity to reflect on every question asked, every situation described, and I believe that I am really building an identity for the mathematics teacher.*

Fabio considers the benefits of the shared teaching experience mainly for himself, describing how this experience affects the constitution of his identity as a mathematics teacher. In the account of Lesson 12, near the end of the module, Fabio’s sense of belonging is even more consolidated, as we can see in the following record:

Fabio (Lesson 12): *I start the lesson. Clearly, I also feel more comfortable to be in the “main” position, sharing the “stage” with Victor. I repeat a phrase I hear from Victor: “You cannot mark as wrong something that is right!”. [...] But, it is noticeable that Victor always wanted to hear my comments on the issues... pretty cool! Important to note the fluency in the students’ participation and mine. We already talk without fear of “being wrong”.*

In the account above, we observe a passage in which Fabio talks about himself and the undergraduates as one same group, about “fluency in participation” and “speaking without fear of being wrong”. The alterity of the students is very prominent in the process of (re)construction of Fabio’s teachers’ professional identity. Moreover, Fabio’s sense of belonging is evident when he states that he feels more comfortable sharing the module with Victor, which was a conceptual proposition of the shared teaching proposal.

The fact that Fabio repeats a sentence he attributes to Victor illustrates how the dynamics of interaction produces meanings and how identity is also constituted through alterity. In Lesson 16, the last of the semester, Victor himself observes that Fabio appropriates some of his own lines:

Victor (Lesson 16): *I also noticed that Fabio says things that I'm sure he learned from me, but to which he gave his own interpretations. For example, he said that "no question is stupid". Then he said that he wants to see the fourth dimension, and even though he knows that this is not possible, it is not a stupid thing to keep trying. So, these are things produced by him, and not mine. I was happy too.*

This excerpt illustrates well the symbolic interactionism approach in the interaction dynamics. The fact that Fabio uses lines usually said by Victor, but with his own interpretation, represents the interaction as a source of meanings and the re-significations from the treatment given to the meanings, in the interpretative process of the individual in interaction with things and with other people.

Final Considerations

The dynamic relationship between identity and alterity occurs in the sense that individuals constitute themselves through identification and opposition. The self and the other are self-determined to a certain extent, from the interactions and re-significations in interpretative processes. The two "stories" told in our analysis were intertwined in the context of interactions. In the reflections of each of the teachers in their logs, we notice that Victor "looks" at Fabio, while Fabio "looks" at the undergraduates. Victor acts with empathy towards Fabio, in a movement of opposition to hierarchical conceptions between the teaching positions in the university and in the school, which are contrary to the premises of the PDC Project. On the other hand, Fabio relies on the acceptance of the undergraduates to build a sense of belonging as an educator of teachers in the shared teaching experience – and such construction is also supported by the practice of empathy.

The records on the lessons, in the form of personal logs of the two teachers, occurred from a methodological orientation of the PDC Project to produce research data. In our interpretation, this assignment ended up being configured as a factor of the development of the aspects that we associate with the concept of teachers' professional identity, both those that emerged from our analysis and those identified by Cyrino (2015; 2016). In practicing the writing in the personal logs, the two teachers developed reflective postures about themselves, about the other, about the undergraduates, composing the dynamic blending of identity processes in interaction in the implementation of the shared teaching experience.

Self-knowledge is an aspect immediately affected by the teachers' reflective processes. Moreover, shared teaching also constitutes a propitious scenario for the exercise of vulnerabilities, in the sense of Oliveira; Cyrino (2011), temporarily suspending certainties and stimulating the exposure to questioning, contestation and self-criticism. Beliefs and conceptions, as well as professional knowledge, are aspects put under negotiation in the dynamics of interaction between the two teachers. The sense of agency is present in the negotiations and interactions that characterize the proposal of shared teaching, leading to decision-making by the teachers.

Thus, referring the aspects outlined in Oliveira; Cyrino (2011) and Cyrino (2015; 2016), the practice of empathy and the sense of belonging make constitute our contribution to

the research literature on the constitution and conceptualization of teachers' professional identity.

The proposal of shared teaching is presented as an alternative to conventional models of teachers' pre-service education, but it is also configured as a possibility of in-service education for the teachers who share teaching themselves. Our analysis indicates that, besides the processes of (re)construction and constitution of teachers' professional identities, the experience of shared teaching also affects teachers' professional development. Thus, we believe that shared teaching experiences constitute a possible scenario for research on in-service teachers' education and also on the education of teacher educators.

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