

Teachers' professional development maximized by collaborative context for teaching and learning statistics

Desenvolvimento profissional de professores potencializado pelo contexto colaborativo para ensinar e aprender estatística

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Abstract

This article seeks to systematize some reflections resulting from a doctoral research that aimed to understand the process of professional development from the perspective of statistical literacy in collaborative contexts, showing evidences of professional development of members from a group of teachers and future teachers of Early Childhood Education and initial years of Elementary School. Based on a qualitative approach, it is a case study of the Group “Estatisticando”. Although the writing and sharing of experiences by the participants were not requirements, this process happened and became powerful extending beyond the group meetings, resulting in the publication of narrative texts, an article and some participations in events. Therefore, the professional development of one of the group members will be detailed, from her narratives analysis. The collaborative context created and the study group journey also showed that teachers and future teachers can investigate their own practice so that they can develop themselves professionally.

Keywords: Statistics – study and teaching. Teacher professional development. Collaborative group. Literacy.

Resumo

Este artigo busca sistematizar algumas reflexões decorrentes de uma pesquisa de doutorado, cujo objetivo foi compreender o processo de desenvolvimento profissional na perspectiva do letramento estatístico em contextos colaborativos, busca também evidenciar indícios do desenvolvimento profissional dos participantes de um grupo de professores e futuros professores da Educação Infantil e anos iniciais do Ensino Fundamental. Numa abordagem qualitativa, trata-se de estudo de caso, o do Grupo “Estatisticando”. Embora a escrita e o compartilhamento de experiências pelos participantes não tivessem sido exigências, esse processo ocorreu e ganhou força se prolongando para além dos encontros do grupo, tendo gerado a publicação de textualizações narrativas, artigo e a participação em eventos.

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Nesse sentido, será detalhado o desenvolvimento profissional de uma das participantes do grupo, a partir de suas análises narrativas. O contexto colaborativo criado e o percurso do grupo de estudos também evidenciaram que os professores e futuros professores podem ser investigadores da própria prática e, com isso, se desenvolverem profissionalmente.

Palavras-chave: Educação estatística. Desenvolvimento profissional do professor. Grupo colaborativo. Letramento.

Introduction

The specialized literature in Statistics Education is clear about the challenges that launches to the educational community. Students should own relational knowledge that can be mobilized and updated whenever new situations request them, rather than an instrumental knowledge, based on an isolated collection of rules and algorithms learned by repetition and routine. We consider that this perspective approaches from the perspective of statistical literacy, through which students can conduct an effective and meaningful learning, that is, the perspective that will serve as a tool to them so that they can interact in various social practices they will experience in their daily lives of citizens.

Teachers, particularly from the early years, are a group very asked to develop and improve educational practice because they are the ones who awaken students to knowledge, including Statistics. Based on this assumption, we created a study group on learning and teaching statistics - its name is *Estatisticando* - that aimed to be collaborative, composed by different professionals related to education, who are trained or are in training and have various experiences in Statistics Education.

This article, therefore, is based on a doctoral research whose main objective was to understand the learning and professional development of teachers and future teachers of Early Childhood Education and the First Grades of Elementary School from the perspective of statistical literacy in collaborative contexts. During the PhD, we were financed by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes) (*Higher Education Personnel Improvement Coordination*) and a scholarship from the Programa de Doutorado Sanduiche no Exterior (PDSE) (*Sandwiches Doctoral Program Abroad*), performing activities at the University of Lisbon.

Here, we begin explaining what we understand about literacy and statistical literacy; a second time, we revisit the concept of professional development of teachers, in particular in relation to Statistics Education, highlighting as the involvement in collaborative contexts promotes such development, emphasizing the narrative analysis of the participant Mie, who was Pedagogy student in the occasion. Finally, we present and discuss that the results point that the involvement in a collaborative context can lead to professional development.

Literacy and Statistical Literacy

When we analyze the term “literacy” in the Brazilian context, we have the concept of alphabetization and literacy. According to Soares (2003), a Brazilian researcher, alphabetize is stop being illiterate, also clarifying that “literate nominates who only learned to read and write, not the one who acquired the status or condition and who appropriated the reading and writing, incorporating social practices that them

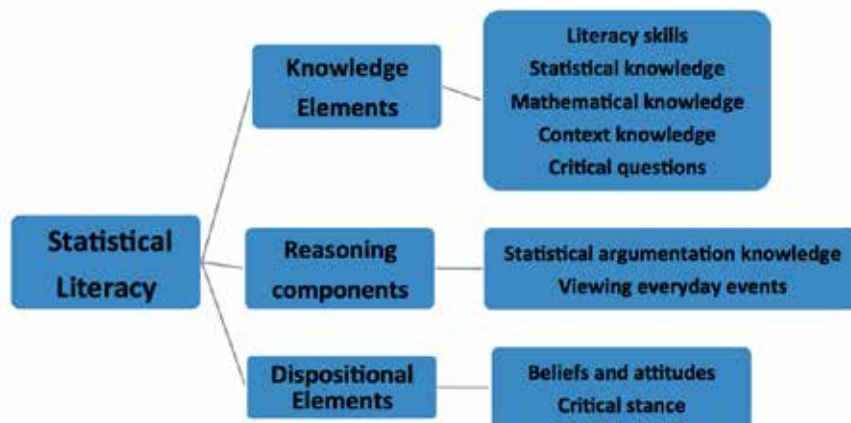
require “(p. 19). For literacy, Soares (2003) mentions as “the state or condition of who interacts to different bearers of reading and writing with different genres and types of reading and writing, with the different functions that reading and writing perform in our lives “(p. 44) briefly defined literacy as” the state or condition of those who engage in numerous and varied social practices of reading and writing “(p.44). In Portugal, the concept of alphabetization is common, but it has been lately replaced by the concept of “literacia”, which according to Benavente, Rosa, Costa and Avila (1996), “reflects the ability to use skills of (taught and learned) reading, writing and calculation “(p. 4),” based on various written materials (text documents, graphics), commonly used in everyday life (social, professional and personal “(p. 4 , emphasis from the author). Because of the similarity of meaning between the terms used in Brazil (literacy) and Portugal (literacia), we chose to use the term “literacy” for this study⁴.

For Gal (2002, p. 2) the term literacy has been “sometimes combined with terms denoting specific knowledge domains” or, in other words, with dimensions from other type, as school literacy, social literacy or not scholar, computer literacy, scientific literacy, statistical literacy, and others.

Gal (2002, p. 1) considers statistical literacy as “a key ability expected of citizens in information-laden societies, and is often touted as an expected outcome of schooling and as a necessary component of adults’ numeracy and literacy”.

Gal (2002) proposes what he calls “a model of statistical literacy” (p. 3), that is, a model of knowledge bases that adults, and also the students in the training process should have available in order to understand, analyze and criticize the statistics that surround us, based on “knowledge elements”(p. 3) and “dispositional elements”(p. 3) that, according to the author, do not occur separately, although they are described in this way to facilitate the presentation and understanding of its dimensions. Budgett and Pfannkuch (2007) added to the literacy model presented by Gal (2002), what they call “reasoning components” (p. 7). We tried to synthesize the ideas of statistical literacy Gal (2002) and Budgett and Pfannkuch (2007) in the following diagram (Figure 1):

Figure 1: Model of statistical literacy based on Gal (2002) and Budgett and Pfannkuch (2007).



Source: CONTI, 2015.

4 In this sense, Barton and Hamilton (2004) use the term “literacidad,” explaining that it is “an activity located in the space between the thought and the text” and as all human activity “it is essentially social and is located in interpersonal interaction “(p. 109, our translation).

Exploring what Gal (2002) classifies as “knowledge elements” (p. 4), we have the “literacy skills” (p. 4) - literacy comprehended in its most general sense and close to what we brought from Soares (2003) and Benavente Rosa, Costa and Avila (1996). The need for such skills arises from the fact that the statistics messages are presented in oral or written texts and why information of this nature often are inserted in complex texts. That is, these skills are essential for reading and writing in social practices. Gal (2002, p. 7) also shows that “the statistical literacy and general literacy are intertwined.” The “statistical knowledge” implies: knowing how data can be produced and why they are needed; become familiar with the basic terms, ideas of descriptive statistics, representations of charts and tables, including their interpretation with basic notions of probability; know how conclusions are reached in that reality, translating this knowledge in order to clarify whether there was comprehension. Regarding to the “statistical knowledge,” Gal (2002, p. 9) still says that including in a course a lot of statistical content is not enough to ensure statistical literacy.

Regarding “mathematical knowledge” (p. 13), we highlight the supporting role it gives to not only to the statistical literacy, but also to the statistical knowledge; however, it - mathematical knowledge - can not be the center of the process, as there are technological support such as calculators and computers. The “context knowledge,” according to Gal (2002, p. 15) “is the source of meaning and basis for interpretation of Obtained results” it means that it is through it that we understand what they mean, in the context, generated data. And the “critical questions” (p. 15) appears as a form of critical evaluation of statistical information, mainly because of the way that often this information can take, for example, the intentional abuse of the data submitted in a sensationalist way.

What Gal (2002) calls “dispositional elements” (p. 17), we understand as positioning, there is an emphasis on interconnection of the concepts of critical stance, beliefs and attitudes. The critical stance is related to the questioning attitude of the information that reaches us, as certain conceptions and attitudes are “on the basis of the critical tance of the people” (p. 17) and they must rely on their power of critical action.

According to Budgett and Pfannkuch (2007) the “reasonig components” (p. 7), added to the model is composed of two elements: the statistical argumentation knowledge and the everyday viewing events from a statistical perspective. The authors add that the knowledge of the arguments include the inferential reasoning of Statistics and construction of statistical statements based on data and graphs, and knowledge in everyday events would involve heuristics awareness that people use for reasoning and visualization on generalizations, everyday, in events of life, from a statistical point of view.

In short, Gal (2002, p. 19) states that the “statistically literate behavior” needs interrelated activation of these knowledge bases (knowledge elements), mentioned in Figure 1, in the presence of the critical disposal to support beliefs and attitudes Gal (2002, p.19) emphasizes “the key role que non-statistical factors and components play in statistical literacy, and Reflects the broad and multi-faceted Often nature of the situações in Which statistical literacy may be activated,” we call dispositional elements. We also believe that the components added by Budgett and Pfannkuch (2007), the reasoning element, expands the perception that, to give an opinion, the

reasoning should have evidence based not only on pre-existing opinions.

Related to literacy and Statistics, Watson (2002, p. 27) completes: “statistical literacy should not be considered the responsibility of mathematics teachers to the exclusion of teachers in other curriculum areas. Getting people to understand and accept this statement is perhaps the most difficult task for statistics educators”; that is, it is almost impossible to lead the student to build knowledge, argue and appropriating of statistical ideas, closing us in on statistical content and / or mathematical. We wonder about how to train students in this perspective, with teachers who work or will work in all disciplines - including Mathematics - from the early years of Elementary School (students from 6 to 10 years old), whose knowledge is still incomplete.

To Batanero (2013), the statistical literacy term has arisen spontaneously among statisticians and statistical educators, to highlight what is done in Statistics, which is now considered as part of the cultural heritage necessary for citizen education, thinking to train students to a full life.

Professional Development of Teachers

The concept of professional development has experienced changes over time. Our approach takes the perspective of the teacher to be professional education.

Develop professionally, according to Ferreira (2003, p. 36), “it could be understood as learning to walk to the change, or expand, deepen and/ or rebuild their own knowledge and practice and develop ways of thinking and act consistent” and “concepts of learning, change and professional development are intertwined”. Ferreira (2003, p. 40) also points out that

[...] the professional development process involves the idea of learning, to become subject of your own learning process. It depends, then, of your dissatisfaction with their knowledge and / or current teaching practice, or even the desire to develop it. it is not possible to grow, learn or decide by the teacher. The teacher needs to feel motivated and mobilized to act.

Day (2001) states that all professional development involves learning and necessarily change, which only occurs if the teacher wants to change. Lopes (2008, p. 68) comments on the importance of the change from the teachers themselves:

Professional development and change will mainly depend on the teachers themselves, as well as their dissatisfaction face to their knowledge and/or current teaching practices that restless them, and also their willingness and commitment to develop and improve them.

This professional development process, with the change starting from the teachers, allows, according to Fiorentini and Nacarato (2005, p. 9)

[...] help them to become the main protagonists of their professional development and educational process as they participate in the construction of knowledge of teaching and the construction of the cultural heritage of the professional group to which they belong.

A study performed by GEPFPM⁵, whose research focus was the training and the professional development of mathematics teachers, showed that there are multiple factors involved and interfere in the professional development process, “personal, social, cultural, historical, institutional, cognitive and affective” factors (PASSOS et al, 2006, p. 196). This study also identified some practices which promote professional development in different areas considered formative: collective practices of thinking, collaboration and research; thinking and research on practical and systematic analysis of the experiment carried out; production of reflexive diaries - usually narrative - on the process of becoming a teacher; active participation as a teacher or student in curricular innovation processes; initial and continuing education projects of teachers monitored through a reflexive process; and questioning and systematic analysis of teaching practice.

Now we can reflect on the processes of formation and professional development specifically for the teaching and learning Statistics, and then reflect on the research groups, especially the collaborative ones.

Professional Development of Teachers in Statistics Potentiated by Collaborative Context

According to Batanero (2002), the fact that statistical content is part of the official curriculum of many countries - the example of the National Curriculum Parameters (BRAZIL, 1997) - does not mean, necessarily, that are taught in different school levels.

Parallel to the curricular issues and the population area of expertise, there are the challenges related to the need of training - didactics and content - teachers who teach Statistics (Batanero, 2002), because this may be the reason, often, not to give due importance to the issue. About this teacher training, Bridge (2011), mentions the ways that can be assumed with greater focus on the content, or in the curriculum, either in the investigation.

Teacher training in statistics can follow many paths. It depends, for example, on which is the view taken for statistical learning. In fact, the path makes a difference when such teaching is focused on: (a) key concepts and procedures, statistical computing measures that represent data in routine exercises, (b) manipulation of data, collection, representation and interpretation of ready data, provided by the teacher, the textbook or the internet, or (c) making statistical investigations, involving a complete cycle from raising questions, collect, analyze, interpret and criticize data and arguments (PONTE, 2011, p. 300).

One possibility for teacher training, in view of the statistical literacy and the path pointed out by Ponte (2011), in which they can train making investigations, making them the protagonists of their professional development process, that is, incorporating them in research groups.

Under this professional development perspective, “school and university teachers, master’s and doctoral students and future teachers can *together* learn to face the challenge of the current school” (FIORENTINI, 2011a, p. 7; emphasis from the author). We are assuming, with Fiorentini (2004), that in a collaborative group:

5 Study & Research Group on Mathematics Teacher Education of FE/Unicamp

[...] everyone work together (co-work) and support each other, in order to reach common goals negotiated by the collective group. In collaboration, the relationships tend to be non-hierarchical, with shared leadership and shared responsibility for leading actions. (FIORENTINI, 2004, p. 52)

We wanted that the collaborative group was constituted as a professional learning and research community on the practice of teaching and learning Statistics in schools in the perspective that Fiorentini (2010) describes:

In each collaborative group the trainers, teachers and future teachers analyze and discuss the problems and challenges brought by teachers, class episodes narrated and documented by teachers and negotiated together meanings and other intervention possibilities in their school practices, particularly tasks and exploratory activities (FIORENTINI, 2010, p. 582).

When we engaged in this process of professional development in a collaborative context, the trainer who investigates and supports the process, the teacher and the future teacher together develop a job that requires, according to Ferreira (2003), identify the theoretical and practical knowledge to develop an effective and meaningful education to students and assume that teachers also build knowledge, analyzing them; taking learning as a continuous process; taking into account the context and also the school reality in which it is inserted or from which he will be part in the future.

To create a collaborative context in the perspective of Fiorentini (2004, 2010), and provide a professional and research learning community on the practice of teaching and learning Statistics in schools, is that we plan fieldwork research, which will be detailed below, with the presentation of the group *Estatisticando* and its participants. We also will detail the methodological aspects of research.

Research Methodology

To understand the learning and professional development of teachers and future teachers Early Childhood Education and early years of Elementary School (students from 6 to 10 years) when they are in a collaborative context and are encouraged to work with Statistics from the perspective of literacy walking toward the statistical literacy, aiming the investigative point of view:

- Understand the professional development process from the perspective of statistical literacy in collaborative contexts, highlighting knowledge development and personal development as members of a group of teachers and future teachers who gather to study Statistics.

From a forming point of view, as a group we also aim:

- From the literacy events, contribute to the professional development of participants with regard to knowledge, looking ahead statistical literacy so we can create situations in which they may develop personally and professionally.

In the qualitative approach, we opted for case studies which, according to Ponte (2006), “aims to meet a well-defined entity as a person, an institution a course, a discipline, an educational or political system or any other social unit” (p . 2)

and its objective, "is to understand in depth the "how" and "why" of that entity, evidencing their identity and characteristics, in particular in aspects of interest to the researcher" (p. 2).

So we wanted to investigate the knowledge, reflections, conflicts, and learning of the participants in this group, considered as "our case", from this research proposal and with the guiding question: What professional development evidences have teachers and future teachers of Early Childhood Education in the Early Years of Elementary School shown in collaborative contexts in statistical literacy practices?

Then, from an invitation sent by email to teachers from neighboring schools who worked in Early Childhood Education from the early years of Elementary School, and students of Pedagogy and Mathematics of a private Higher Educational Institution, it was created the "our case" group named "Estatisticando", in the second half of 2010, which met regularly and voluntarily from September 2010 until December 2011, totaling 20 meetings.

As regards the collection of data, we used audio and video recordings, a profile identification form of the participants was individually filled and an oral characterization was answered in groups, the participants of the group brought materials and produced narratives.

The group came to have 20 interested, but most of the time, it was formed by nine participants: Keli, researcher and trainer of teachers, who worked in courses of Pedagogy and Mathematics; Silvana, a retired teacher, with working experience in Early Childhood Education (from 3 to 6 years old); Eduardo, a teacher in early career, working in the Early Years of Elementary School (from 6 to 10 years old); Rosana, Pedagogy student, who has worked as a teacher in Childhood Education; five students Pedagogy, whereas Roseli and Mie already performed in the Early Years of Elementary School because they were the last year of the first degree, and Thaynara, Érica and Cíntia, who were at the initial period of the internship in the Early Years of Elementary School because they were in the second year of the first degree. All participants agreed that it was used their first name in the search.

In the meetings, which lasted approximately 50 minutes, we inspired in the dynamics of work and research of collaborative groups. In this dynamic work, trainers act according to the demands of teachers and future teachers, who bring problems and challenges of school practices, so that together they can study, discuss, reflect, investigate and write about the complexity of teaching and learning Statistics in schools (FIORENTINI, 2011).

As expected, the group did not act cooperatively from the beginning. In the first meetings we expected that the researcher brought the materials and conduct meetings; but gradually all began to participate more in decisions, taking responsibility in the group work, preparing or indicating materials, and the space became more collaborative when the affinity in the relationship between the participants increased.

In this process, effective collaboration also came from the desire to report writing the process lived and the experiences developed in the group and with the support of the group, which we will explain.

Producing Knowledge in the Group

Although we wanted the participants to write and share their experiences,

this was not a requirement to participate in the group, and we believe that if this were presented at first, might not attract teachers who were not able to produce knowledge from practice of their classrooms. So, seeking to encourage the writing, not requiring it, this process gained strength in the second half of 2011, when the group has met for more than two semesters. It also extended beyond the group meetings, occurring mainly via email.

Considering that the studies carried out in the context of collaborative of the group *Estatisticando*, they encouraged the research of teaching practice, initially in moments when the highlight was for the teaching and learning Statistics with students from the Early Years of Elementary School. The results, as well as in the Group of Saturday (GoS), were textualized in the form of narratives. According to Carvalho and Fiorentini (2013), this type of research, as well as with the GoS, is closer to a narrative analysis. These authors state that “narrative analysis”

[...] express a knowledge of practice because, although usually originates in practice, the situations were problematized, analyzed and systematized narratively, having as mediation readings of academic and professional courses and the multiple perceptions and interpretations of critical partners [...] (p.22, emphasis of the authors).

Still on the narratives textualizações approaching narrative analysis, according to Carvalho and Fiorentini (2013, p. 17, emphasis added), “more than the conceptualization of a genre, this statement refers to a process,” adding that this process are generated texts that are “heard / read / seen”. In this context, thinking of experienced process, call narrative texts produced by the participants of “narrative analyzes of classroom situations.”

In this sense, were produced eleven texts, of which I participated as co-author, partnering with one of the participants, seeking to act as a critical partner: ten narrative analyzes of classroom situations and an article, from a scientific initiation, always aiming, as argued Kilpatrick (1996, p. 118), the “teacher as researcher”, more than just the research subject. It is also important to mention that the work produced by members of the group *Estatisticando* were presented at events in the area of Education and Mathematics Education, in order to discuss with the academic community the practice of the classroom and the group. Although we can highlight marks of the professional development of participants in all the texts, by the article limitation, we chose to detail the narrative analyzes of Mie, and especially her first experience with the construction of graphics, which are presented below.

Narrative Analyses from Mie

Among the of classroom situations of Mie, we chose to detail her first experience with constructing a graph in the classroom, where she was a teacher, but we also present her second narrative analysis. We evaluated these narratives as interesting to be explored, because Mie was in transition - completing their initial training and starting her professional life - in a step that could decide what to propose to children. Mie was more confident in working with a topic related to Statistics because of the quality of her participation in the group from the beginning. Moreover, her proposal to carry out a teaching situation with children came after the presentation and discussion of the work done by another member of the group, with children of

the 3rd grade of Elementary School. By the time we watched the video produced during the execution of the pedagogical situation of the participant with his children, in order to celebrate birthdays, I proposed to the other participants to carry out other videos, and Mie told us she would perform a internship with children from the 1st grade of Elementary School, and also showed concern with the number of children (nine). Her stance apparently changed after the group proposed to help her in planning the pedagogical situation, as shown in the record of the passage of transcription in video made in June, 2011:

Keli: Mie could talk to the teacher, if she says "ok"...

Mie: The number of students is only nine. Nine students!

Eduardo: I am so envious!

Keli: All right! We can help Mie planning what she needs to take!!

Mie: Yeah! (celebrating)

Keli: What can we do with nine children?

Rosana: It is true!

Keli: We plan and the person goes there safer. You don't need to fall from a parachute... Mie, if you feel comfortable, you can write down everything you will do. What you will ask... And then you take notes... So, you get there more...

Rosana: Prepared!

Keli: Prepared! (Video file from the researcher. Time range from 0:41:00 to 0:41:57).

Mie, motivated by discussions and presentations by the work of her colleagues and supported by the group, felt safer to prepare and propose a pedagogical situation to the class of the First Grade of Elementary School (6 years old children) a private school in Atibaia (SP), where she performed her compulsory internship in 2011. The time of participation in the group contributed to this security because at that time the group has met for about a year. We consider that the availability, security and motivation to carry out the educational situation with children are evidences of the group contribution to the professional development of Mie as knowledge and personal development.

For planning, we took as a basic reference document the National Curriculum Parameters - (PCN) (BRAZIL, 1997), as it contains a topic called "Treatment of Information", which includes the study of Statistics.

Initially, Mie put some ideas on paper and sent by email to the group. They still were l general ideas, without the worry of using proper and precise terms (Chart 1), which she named "Class Plan":

Chart 1: Excerpt of the first version of the class planning presented by Mie.

CLASS PLAN

TOPIC: graphic – number of pets
GRADE: First Grade of Elementary School
CONTENTS: count numbers, making chart, compare the numbers
ESTIMATED TIME: 2 classes

Source: Archive of the researchers.

After the discussion in the group and another email sent to the researcher, the plan was redesigned, with changes in relation to the name of the chart to be working, using the name “construction of a column chart” and the use of terms such as “quantification” and “comparison frequency”, to replace the words “counting numbers” and “compare numbers” respectively (Chart 2).

Chart 2: Excerpt of the final version of the class planning presented by Mie.

CLASS PLAN

TOPIC: Bar chart construction - quantity and types of pets
GRADE: First Grade of Elementary School
CONTENTS: quantification, chart construction, comparing frequencies
ESTIMATED TIME: 2 classes
GOALS:
1) Take the student to know a column chart and how to interpret it, count and compare numbers using the chart;
2) Integration with Portuguese, quite emphasized in the Early Years of Elementary School;
3) Learn English;
4 Learning elements of another culture, the Japanese.

Source: Archive of the researchers.

Once more motivated by the group, which had encouraged the realization of the the pedagogical situation with the children as well as its filming, Mie decided to write a narrative analysis of the experience. We consider the production, according to Freitas and Fiorentini (2007, p. 63) from two perspectives, “as a way to reflect, report and represent the experience, producing sense of what we are, do, think, feel and say” and also “as a way to study/investigate the experience, that is, as a special way of interpreting and understanding the human experience, taking into account the perspective and interpretation of its participants.” According to these perspectives, to Mie, writing was the way to make sense of experience and for us, as researchers, how to investigate the experience.

The first version of Mie narrative analysis was only sent via email to me (Chart 3), because we believed that at that moment she felt more comfortable with that than to share with the group. Her e-mail also shows insecurity in relation to what was expected of her, present in the expression “I think I need to rewrite.” This request helps to translate how Mie considered important for their professional activity of teacher in the early years of Elementary School, reflecting on her practice in the classroom.

Chart 3: Presentation of the first written proposal of Mie.

I am sending a class report about the chart construction in the Elementary School. I think I need to rewrite, but I want to show my report. Is it better top ut more comments? Maybe. So, see you! Thank you, as always!

First email sent by Mie to the researcher in 09/09/2011.

Source: Archive of the researchers.

The proposal attached to the email by Mie was named the “Class Report” (Chart 4). The text also showed evidence of little experience with this kind of narrative writing, since she enumerated the events experienced in the classroom, like topics of a report. One of the group’s goals and professional development proposals was to help her in this development.

Chart 4: First file with the written proposal of Mie.

Class Report

1st STEP:

1-1 I presented the topic today saying “ Today we are going to learn charts”.All students seemed not to understand.
1-2 I asked to the children, [Do you have pets at home?] [What pet do you have?] They answered [dog, cat, fish, bird and e turtle].
I asked them to raise their hands and asked [Who has a dog?][Who has a cat?][Who has a bird?][Who has a fish?].

First file sent by Mie to the researcher in 09/09/2011

Source: Archive of the researchers.

This proposal was discussed and redesigned, using mainly electronic means between one of the researchers, Keli and Mie, to enrich the narrative analysis and at the same time contribute to critical reflection on the events lived in classroom, aiming, as Kilpatrick argues (1996, p. 118), the “teacher as researcher”, more than the research subject. Thus, the first narrative analysis entitled “Pet: first experience with chart construction” (KATO; CONTI, 2011) was presented at the First Mathematics Meeting in Early Years (I EEMAI - UFSCar and published in the event annals .

This first narrative analysis served as the embryo to its rewritten, to new insights from the experiences to carry out the pedagogical situation with the children and their writing.

In Chart 5 there is excerpt of the the second published narrative analysis, in which we can see advances both in writing and reflection. We can mention, as an example, this information in two productions – “today we will learn to make a graphic” and “the students did not seem to understand”- which was expanded in the rewritten, with interpretation “perhaps giving evidence that had not been experience with this content or, if they had, the term has not been presented or made significant.”

Chart 5: Excerpt from the published narrative analysis.

1st STEP: starting class

Mie, who already knew the eight children of the class, which was full that day, she started the class presenting the work with graphics, saying, “Today we will learn to make a chart.” The students did not seem to understand very well what it was, perhaps giving evidence that had not had experiences with this content or if they had, the term has not been presented or made significant.

To continue the activity, the following questions were asked related to the theme “pets” chosen by Mie for thinking it is an interest of students:

- Do you have pets at home?
- What pets do you have?

The answers came all at once, “dog” “cat” “fish” “bird” and “turtle”. To organize the participation of children, we asked them to raise their hands who had each animal mentioned.

Source: Yokomizo, Conti and Carvalho (2012).

From the point of view of the development time of this pedagogical situation of a bar chart construction with children,

This proposal only lasted a class and even extended a bit more than provided by the teacher, but it was very profitable, the students proved to be motivated and involved, commenting that liked the proposal and that the activity “was cool,” and even anticipating results. We believe that we provide a good initial contact with the Statistics. Students were encouraged to observe, make hypotheses, raise the data, organize them (treating them) and perform the reading and interpretation, organized in a graph and table. We can consider that the choice of the theme “pets” was also important looking from the interest and “real life”, encouraging students to observe phenomena that occur around (Yokomizo; CONTI; CARVALHO, 2012).

Regarding the professional development of Mie, according to Passos, Oliveira and Range (2009, p. 148), we see through the course of the narrative analysis writing, signs of “consciousness processes of her knowledge in an ongoing perspective which consists from her student career to her professional autonomy stage” and her evolution, as well as other teachers, participants of the group, when “assume the responsibility of their own professional development”. We can find marks of this autonomy and confidence in the email sent by Mie to the researchers (Chart 6) almost a year after this experience have occurred:

Chart 6: Last email sent by Mie and to researchers

I would like to thank you very much for this opportunity and orientation from you. The first experience of building graphs with the kids led me to the first experience of signing the authorization of publication!
What a great experience!

E-mail sent by Mie to the researcher on 05/18/2012

Source: Archive of the researchers.

The teacher, in this process, according Fiorentini (2009, p. 253), “acquires autonomy, becomes the subject of his profession” and, therefore, “is qualified to participate in the public debate and to develop projects and study groups inside and

outside of the school, producing curricular innovations from the school practice”, so, he becomes more competent, a real “statistical doer”.

Final Considerations

The activities experienced in the group Estatisticando sought to consider the school as a workplace and professional learning, but also the opportunity for participants play a role in their professional development.

We consider, in the space provided by the group Estatisticando, that participants might relate collaboratively, as well as presents Fiorentini (2011a), “involving trainers, researchers and future teachers who take research as stance and social practice” (p. 17) and concluding that this context “is rich and powerful for professional development, transformation of pedagogical and curricular practices of producing knowledge and a new culture for teaching and learning” (p. 17).

The work in the group sought to be collaborative, so we believe that we contribute to the professional development of teachers and future teachers Early Childhood Education and early years of Elementary School, which were perceiving able to handle to Statistics, confident that they could work with his students a perspective of statistical literacy.

We expect to contribute to the formation of statistically more competent people, able to use the Statistics in solving problems of everyday life, positioning and using it to make decisions, aware of their power to critical action.

Therefore, we consider important to continue the study groups and collaborative contexts where different professionals share and reflect on professional practices in Statistics classes, as a domain of knowledge often associated with a simplicity in their teaching and learning, seeking to document the different stages of the history of these groups, showing their feasibility and their relationship with significant learning for both teachers and students.

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