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# National Curricular Parameters for Mathematics: From the Creation of the Kaleidoscope to the Necessity to Look Back to Move Forward

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## ABSTRACT

**Background:** In the last decades in Brazil, the prescriptions of the official curricular documents of school mathematics have been constituted as a practice of successive governments. However, there is still little research on the participation of mathematics teachers and educators in the construction of these prescriptions. **Objective:** To present the perspective of the research collaborator in the general coordination of the PCNs (National Curriculum Parameters) in the area of Mathematics (3rd and 4th cycles of elementary education). **Design:** This is a qualitative research, with the production of a documentary source through interviews with thematic oral history procedures. **Setting and participants:** The research collaborator was professor Dr. Célia Maria Carolino Pires, and the interviews were conducted at her residence. **Data collection and analysis:** Oral sources were used, in the form of interviews with a researcher in the field of mathematics education, as well as written sources that complemented the necessary information. **Results:** This article presents a thematic section that, on the one hand, makes public the opinions of a person who actively participated in the elaboration and diffusion of the PCNs; and, on the other hand, it invites us to reflect on how - in the last 50 years in Brazil - primary school teachers have had the opportunity to be supporting/protagonists in terms of curriculum production, and how this production has been conducted and understood as a government policy (and political parties) and not a State policy. **Conclusions:** The article presents considerations made by a participant engaged in the process of elaborating and disseminating the Mathematics PCNs for the 3rd and 4th cycles of elementary education and - in addition - it was constructed to promote a reflection on

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more recent themes that include, for example, to think about how external assessments start to induce the production of curricula, functioning as thermometers that supposedly can capture the productivity indices of the school system and, at the same time, promote more symptoms of the illness they intend just to "gauge".

**Keywords**: National Curricular Parameters; Maths Curricula; Oral History.

**Parâmetros Curriculares Nacionais de Matemática: da criação do caleidoscópio à necessidade de olhar para trás para avançar**

## RESUMO

**Contexto:** Nas últimas décadas no Brasil, as prescrições dos documentos curriculares oficiais da matemática escolar têm se constituído como uma prática de sucessivos governos. Todavia, ainda são poucas as pesquisas sobre a participação de professores e educadores matemática na construção dessas prescrições. **Objetivo:** Apresentar a perspectiva da colaboradora da pesquisa na coordenação geral dos PCN (Parâmetros Curriculares Nacionais) da área de Matemática (3º e 4º ciclos do Ensino Fundamental). **Design:** Trata-se de uma pesquisa qualitativa, com a produção de fonte documental por meio de entrevistas com procedimentos da história oral temática. **Ambiente e participantes:** A colaboradora da pesquisa foi a professora doutora Célia Maria Carolino Pires e as entrevistas foram realizadas na residência dela. **Coleta e análise de dados:** Recorreu-se tanto às fontes orais, na forma de entrevistas com uma pesquisadora no campo da educação matemática, quanto às fontes escritas que complementaram as informações necessárias. **Resultados:** Este artigo presenta um recorte temático que, de um lado, torna públicas as opiniões de uma pessoa que participou ativamente da elaboração e difusão dos PCN; e, de outro lado, convida à reflexão sobre o quanto – nos últimos 50 anos no Brasil – os professores da escola básica tiveram oportunidade de ser coadjuvantes / protagonistas no que se refere à produção de currículos, e como essa produção tem sido conduzida e compreendida como política de governo (e partidos políticos) e não de Estado. **Conclusões:** O artigo apresenta considerações feitas por uma participante engajada no processo de elaboração e difusão dos PCN de Matemática para o 3º e 4º ciclos do Ensino Fundamental e – além disso -, foi construído de modo a promover uma reflexão sobre temas mais recentes que comportam, por exemplo, pensar sobre os modos como as avaliações externas passam a induzir a produção de currículos, funcionando como termômetros que supostamente podem captar índices de produtividade do sistema escolar e, ao mesmo tempo, promover mais sintomas da própria doença que supostamente busca apenas "aferir".

**Palavras-chave**: Parâmetros Curriculares Nacionais; Currículos de Matemática; História Oral.

## INTRODUCTION

The main objective of this article is to present professor Célia Maria Carolino Pires's (1948-2017) perspective on the PCNs from excerpts of a set of interviews carried out in December 2016. This thematic fragment addresses the teacher's experience with the ministry of education (MEC) in the general coordination of the National Curricular Parameters for Mathematics (3rd and 4th cycles of elementary school). However, before presenting the teacher's points of view, it is important to explain some elements related to the methodology and theoretical foundation for research with oral history

## CIRCUMSTANCES AND FOCUS OF THE LITERATURE

One of the first requirements for an article is that it be situated next to several others similar to it or that share some references with it. In works involving oral history, this requirement is always met in a transversal way because it is evident that an article that intends to bring to the public someone's contribution – in this case, professor Célia Maria Carolino Pires's – should not allow it to disappear amid an apparatus of "recitals" made by the authors of the article. Thus, the initial assumption that must be present for each reader is that this article brings, in an unprecedented and unique way, subsidies to the curricular discussion made by someone who experienced them intensely, and that is where its relevance lies. This type of study and article is not uncommon and, in fact, expands with the course of its multiple forms of use within the academy. In *Oral History and Public Memories*, Paula Hamilton and Linda Shopes (2008) say thaoral history practice is present in a wide range of cultural institutions, websites and community forums, which, together, demonstrate an understanding of oral history as something more than an academic archival activity. For them, oral history is a deeply social practice that connects the past and the present and sometimes connects narrative to action. The authors also point out an increasing awareness of oral history continually operating as *an act of interpretation*, which reflects in extensive theoretical literature. In our words, it is important to highlight that this *interpretation* is in each step of the text organisation rather than in parallel comments, before or after what the research collaborator said. Thus, in the introduction to the book mentioned, the authors give an overview of research in oral history in association with the ones who seek to theorise and problematise the issues of memory. In our view, they make it clear that there is a distance, which we can call *epistemological*, between these different theoretical objectives, which are not an object of oral

history since, although it evidently triggers memory at each moment, it does not aim to problematise that memory, question it or even trigger mechanisms that supposedly could optimise it. This attitude of oralists (practitioners of oral history) can be criticised in several ways, but it is necessary to be clear about the process by which the story of an individual - or what they have to say about a topic - recorded in an interview, can be transformed and gain a broader dimension by joining a social construction, as here in this article, which is related to a whole history of the construction of a (mathematics) curriculum and a public policy.

The contributions of oral history to mathematics education in Brazil have gained international relevance and were widely disseminated with the publication of the book *Oral History and Mathematics Education*, organised by Antonio Vicente Marafioti Garnica (2019), for the collection *History of Mathematics Education* by Springer. The presentation page shows that the chapters produced by members of GHOEM (Research Group on Oral History and Mathematics Education) are based on philosophies, theories, and contemporary methods of oral history. Also, the authors see themselves as part of a *developing* oral history tradition. The book gives readers access to an increasingly important approach to research, interpretation, and documentation of the history of mathematics education. For our references on the method, we will rely mainly on the introductory chapter, written by Garnica and Vianna (2019): *Oral History in Mathematics Education: An Overview*.

## SPECIFICS OF ORAL HISTORY

In general, there are two types of work that take oral history as a starting point: life histories and thematic histories. In this article, we will not address aspects related to life history. With this, we define that although we could make biographical remarks about professor Célia Maria Carolino Pires, the purpose of this article is focused on her contributions to curricular proposals for mathematics. Thus, the focus of the article turns to the thematic aspect and this is what we need to situate. In thematic oral history, according to Garnica and Vianna (2019),

> [The] interviews can be focused on a given theme (...) in which the researcher's interest is more specific and focused on a moment or situation that is somehow familiar to the interviewee. The interview is organised around this theme, and all the questions in the script are linked or close to it. The

> narrative will be richer as the interviewer is accepted as an interlocutor, having recognised his/her legitimacy. (p. 18)

Garnica and Vianna also point out that works with oral history aim to create sources and that researchers "(…) create those sources to understand a specific theme in their field, that is, they create sources to find support in them for their research."

Oral history is considered a mixture of epistemology and research methodology since its procedures are directly linked to a way of thinking about history and looking at knowledge to collect registers and incite and institute them. Since long some procedures for research using oral history in mathematics education have been established, which were summarised by Garnica (2003):

> [...] Oral History requires a pre-selection of the deponents – or a significant criterion to select them –, recorded interviews – recordings that will constitute the basic document of the research –, instances of transformation of the oral document into written text – a set of processes distinctly named and conceptualised in the investigations under analysis (we speak of transcription, de-recording, transcreation, and textualisation) –, a moment that could be called "legitimation" – when the document in its written version returns to the deponents for conference and subsequent assignment of rights of use by the researcher and, finally, a moment of "analysis" – certainly the most difficult to apprehend. (p. 10)

The first element highlighted was the pre-selection of the interviewees. Alberti (2005) states that this screening requires a previous look into the object of study. She points out that it is necessary to be aware of the theme and the understanding of the respondents' participation, the role of the groups they participated and, "in these groups, stood out to identify those who, in principle, would be more representative depending on the issue to be investigated" (p. 32).

By focusing on curriculum reforms and mathematics teachers' continuing education, the name of professor Carolino Pires stands out to those who remember the actions related to the construction and implementation of the PCN. Her words become more relevant when considering that she was also a researcher in the curricular field, who experienced the plots of public policies

related to mathematics education as a student, teacher, coordinator, and principal of public schools in the state of São Paulo.

The interviews were the result of a research project approved by the Ethics Committee of the HEI[1] and, from the beginning, the collaborator signed the Free Consent Form, receiving the guide script of the interviews so that she could be situated on the topics that would be addressed. The interviews were filmed and recorded in three sessions, on December 7, 9 and 19, 2016, at her home. Each afternoon of work lasted about three hours and was full of hospitality and friendliness of everyone in the house.

The interviews were recorded and transcribed. A *transcript* is a written document that maintains most of the orality characteristics, such as repetitions of words and ideas, pronunciation and agreement errors, and occasional cohesion mistakes. The *transcript* also registers the noises, such as phone rings or coughs and laughter during an interview.

According to Garnica and Vianna (2019), after this stage, the *textualisation* process begins.

There are levels of textualisation: the researcher can choose only to exclude some of the orality-specific registers from the transcript and fill in some gaps. Commonly, the research collaborator him/herself demands this "cleaning." In a more elaborate textualisation, the researcher can choose to reorder the discursive flow of the respondent, and this reordering can be done thematically or chronologically. Some researchers maintain the questions and answers, others include the questions in the answers in a single text, without the interviewer's interventions.

These textual operations should not interfere with the content of the collaborator's speech. The final text is authored by the researcher but elaborated from the collaborator's speech. Thus, in a negotiation process, it becomes a documentary source. Garnica and Vianna (2019) warn that:

> As a last remark about the textualisation, it should be noted that although free to edit the text, the researcher must, as much as possible, maintain what is called the "vital tone" of the

1The project was approved on the Brazil Platform with the title: "Retraços das reformas curriculares e da formação continuada de professores de matemática do estado de São Paulo" [Traces of curriculum reforms and mathematics teachers' continuing education in the state of São Paulo] with CAAE number 62105716.5.0000.8084, had a start date scheduled for 11/16/2016.

> interviewee, that is, ways of speaking and characteristic expressions must be kept because both interviewer and interviewee must recognise themselves in the text. (p. 9)

Once the textualisation work has been completed, the research collaborator must validate the text. The interviewee has the power to decide on the publication of what has been textualised. Thus, the transcript and textualisation (separated into paragraphs) of our original research work were handed to our collaborator, professor Célia Maria Carolino Pires, for validation.

For Garnica (2006), analysis is the most complex stage of the research but allows "the elaboration of understandings by the researcher" (p. 260). It is important to note that such understandings should not be constructed from fragments of the speeches, much less from evaluating what was said. Over the years, GHOEM has developed several techniques to elaborate those understandings of the objectives of the academic works, dissertations, and theses, within which the results of the research were presented.

After these brief epistemological and methodological considerations, we present the thematic fragments of the interviews that cover the object of this article: the involvement of the collaborator with the National Curricular Parameters for Mathematics (3rd and 4th cycles of elementary school). The excerpts are presented in the first person singular, nonstop. It is also important to highlight to the contemporary reader that the PCNs were a comprehensive proposal referring to all curricular disciplines, produced over the years, serving all segments of the basic school. Professor Célia Maria Carolino Pires was an active participant in the elaboration of the mathematics parameters contained in the "package" that covered the first cycle of elementary school. Academic works many times refer to the PCNs as if they were one whole thing. However, they were very different productions, one for the second cycle (called then 5th to 8th grades) and one for high school. Also, even considering only the first cycle of elementary school, there were significant differences regarding the production processes of the parameters, which were evidenced, for example, by the negative reactions and rejection of scientific societies to what was presented in some areas of knowledge (a notorious case concerns the History contents).

The text that follows is divided into five sections, numbered to facilitate the reading and organised according to the collaborator's statements and the title of this article: from perceiving a kaleidoscope to considering the need to look back to advance.

## THE MEC PROFESSIONAL: FROM SÃO PAULO TO BRAZIL

### 1. The Parameters: the amazing mission of creating a kaleidoscope

Professor Tânia Campos[2] invited me to work at PUC. I had been working there for about two months when I was invited to work at MEC. I talked to Nilson[3] about the invitation, he had just supervised my doctoral studies and was the first person I talked to, I wanted to know what he thought [about it]. He said: it is very worth it, go, it will be great!

Some people I had already worked with were in the coordination of the PCNs, they knew my previous work and invited me to work at MEC. I worked simultaneously at PUC and MEC, but this caused a problem with PUC, as I started to go often to Brasília to participate in meetings. First, the proposal was that the work would be done in São Paulo, but then it was not so. The group had to take many trips to discuss at several universities around Brazil countless times. I requested leave from work at PUC that semester and only started, effectively, after two semesters.

The work in MEC began in the middle of a series of issues. The minister was demanding a[4] Common National Curriculum. The minister said: I did not invent it, it is in this Constitution[5] that was approved!

Notably, this national curriculum proposal was ambitious and grandiose, after all, we have a tradition of decentralising curriculum proposals to states and municipalities. In this situation, we had a dilemma about how to make a curriculum proposal for a country with such great cultural, social,

2 Prof. Tania Maria Mendonça Campos.

3 Prof. Nilson José Machado.

4 Prof. Paulo Renato Costa Souza (1945-2011).

5Article 23, item V, of the Constitution of the Federative Republic of Brazil of 1988 says that it is the joint competence of the Union, the States, the Federal District and the Municipalities to provide the means of access to culture, education, and science, and Article 210 shows that minimum content for elementary education will be fixed to ensure common basic training and respect for national and regional cultural and artistic values. However, article 9, item IV, of Law No. 9.394 of December 20, 1996, highlights the creation of a curriculum and its minimum contents. The article says that in collaboration with the States, the Federal District, and the Municipalities, competencies and guidelines for early childhood education, elementary school, and high school must be established to guide the curricula and their minimum contents to ensure common basic training.

economic diversity and everything else. On the other hand, there was the constitutional requirement for a common minimum curriculum. This was the background discussion for the teams that were called.

There were many rumours that the project had been created by the World Bank, and there was U.S. interference backed by the United Nations Development Program (UNDP). Well, either I am too distracted or never noticed it in the meetings I attended, [I saw] no outside interference. We kept thinking: could it be that there are some U.S. fellows in hiding saying "boo" in our ears, and we don't see them? Nobody said anything in our ears; on the contrary, we asked someone to read and discuss the document because it was growing in substance, and we had no one to discuss it with. It was an internal discussion between Brazilian educators, and there were people from various currents and ideas. I never saw any external project.

Besides that conspiracy theory, there was also hearsay that the curriculum was identical or almost a copy of the Spanish curriculum. Frankly speaking, when drawing up any curriculum document, it is necessary to consult what exists in other countries. For my doctoral degree, I had mapped curricular documents from several countries, looking into the idea of a network. I researched mathematics curriculum documents from Italy, the United States, Portugal, Spain, Japan, among other countries. In this MEC group, obviously, even by a duty of office, we deepened this debate, going into what was proposed in the curricula of other countries. We have come to the conclusion that in mathematics, there are many more similarities than differences.

Regarding the content blocks, the major questions or methodological axes, a more or less standard discourse is noticeable in all countries. When we developed the PCNs, there was no curriculum without emphasis on problem solving, as a methodological axis, and technologies issues.

We asked: Why did one copy the other? The answer was: No one copied, those are the trends! It is impossible to invent different things, and we went in the same direction. Well, we developed the parameters.

At first, I, who had experience in the State Office; professor Teresa Perez, an expert professor in the[6] early years; and professor Maria Amábile Mansutti, who was also an expert in the early[7] years and had worked at the City Hall of São Paulo for a long time worked on the mathematics parameters.

6 Prof. Maria Tereza Perez Soares.
7 Prof. Maria Amábile Mansutti.

Then, for the final years, the team was expanded, and thus, other people participated, Ruy[8], for example, was one of the people who participated. There was also a group of consultants and advisors to the document. The document was sent to the universities and education offices. We had a large MEC team producing the reports and summarising the suggestions.

The document was redone "n" times to reach some consensus. Although *consensus is* something that does not exist in this area, we sought to balance some tensions.

Still thinking about the preparation of the documents, there were almost no political guidelines for the production of mathematics parameters, because mathematics was seen as a neutral discipline. In practice, after a while, I was able to better understand how the ministry of education worked. There was an illusion that the minister was a "superpowered being," but no… the minister's only concern was that the documents would not cause major problems.

When we presented the mathematics document, the minister wanted to know whether there was no excess calculator and whether people would not complain that the children would become lazy because of the use of the calculator. His concerns were very much tied to those issues. Notoriously, in the history document, the political question was evidenced: By what bias will the historical fact be told? Mathematics, unfortunately, does not arouse either passions or discussions because everyone thinks it is harmless as it is considered neutral. The worries were only the use of the calculator because it could be in the newspaper that the children would no longer think, they would only press buttons. I said, that is not written anywhere! But you have to use the calculator. The late minister Paulo Renato said: I do not know, I think I would not let my children [use it]. And I thought: You would not let your children, but would you [let other] children do it?

## 2. The Parameters: a box of surprises

As soon as the PCNs were ready, the question came up: What are we going to do with this now? The first big decision was to disseminate them widely. Never, really, has such great publicity been made. The schools received boxes with the documents, a huge investment was made to disseminate that material.

8 Prof. Ruy César Pietropaolo.

We organised a project called *Parameters in Action*[9]. I coordinated this project and participated in the preparation of the material that aimed to answer some questions generated by the PCNs, such as: What will be done with the box when the teacher receives it at school? How is a curriculum implemented? How do you appropriate the discussions of those documents? How do you confront this with what you have been doing? What types of materials can you select to implement? Although it has been little studied in the literature itself, I did not find such works, even because it was something that passed, it was a government programme...

The receipt of the box was an event in several Brazilian cities, and there were hilarious stories that could only happen in this "daring Brazil" ("Brasil varonil"). The box contained the twelve volumes of the PCNs, the introductory document with the general concept, Portuguese language, mathematics, history, and others, and the document with the cross-sectional themes. Each school received that box and a study script of the project *Parameters in Action*, delivered in another box. A good amount of material was sent to each school. On one occasion, a mayor found the box so cute (and it really was!) that he did not want it to be sent to the schools, so he ended up constructing a 'little building' and keeping all the boxes inside it. The mayor's justification was that it would be a shame to distribute them because he did not know what schools would do with them. He had the building constructed and called the MEC to inaugurate the room with the boxes. I did not go, thank God! God protected me.

The MEC representatives arrived and found several boxes tidily stacked. Then they said, "the boxes must go to school and to the teacher's hands because they was made so that each teacher receives one." The mayor replied, "they will spoil them, this is a very beautiful material!" The people from MEC said: "And how will the teacher read this?" The mayor replied, "if the teachers want, then they can come in here." In the end, I think that the MEC convinced the mayor to use the "little room" for another purpose and distribute the material. This happened in a municipality in the countryside of the state of Bahia.

But anyway, the box was very well received, it was a novelty. We noticed the lack of materials throughout Brazil.

9 The Project offered teachers and other education professionals subsidies to elaborate their plans and actions in the classroom based on the ideas of the PCN. The exchange of experiences could bring elements that would help the teacher to adapt to the peculiarities in which the school is inserted.

Our team was branched, and each one of us travelled to somewhere else in Brazil. I remember when I went to Manaus to do a week-long training with the teachers. At that time, the box still did not exist, there were only handouts. A teacher would not let go of the material. Giving the guidelines, I said, “this is a preliminary material, this writing is not yet the definitive one, so you read and scrawl on it, and then we will discuss it.” The teacher replied: “No, I will not let anyone scrabble on it because this is gold for me”. I think she taught Pedagogy, of all the subjects in the curriculum, and there was no material for her to consult.

Imagine the MEC bringing ten handouts, and the teacher does not have any material to go to the classroom. That, for her, was gold powder, she did not want them to scrawl on it, she kept holding it like a son, with the utmost care. Later, I realised how ridiculous we were being. The connotation of the material to her was different from mine. I do not know how much she would understand from reading it.

We started to see the neediness, how things in Brazil are so crazy. We had no idea of the gap...

Another interesting episode was at the Federal University of Santa Catarina. They prepared a kind of plenary and put the developers of the PCNs sitting at a table. It was like a courtroom, I never felt judged like that. It was like a jury court. We heard imprecations, and they said that the curriculum was neoliberal. Some people at the table started arguing with the audience. I did not speak. I was so impacted then, I needed to think a little. I thought: What are these people talking about?

In the afternoon, the meeting was in small groups, and I went with the mathematics group. There, I said: “Guys, what you said this morning, all that anger in the auditorium, that made me very worried, I do not want to be known in history as a neoliberal, and I do not know what it is to be a neoliberal, but it does not seem like a good thing, so I do not want neoliberal mathematics.” I did not know this type of category, but they said yes, that there was neoliberal mathematics. So I said, “you will do the following, take those pens and underline in this document all that is an indication of neoliberalism, and I solemnly promise that this sentence will be thrown away...”

They were like, "ti, ti,  ti,ti, ti, ti." It was clear that no one had read it, and when they began reading it, they started to reverse it. One of them said, “has Paulo Renato read this document?” I answered, “no, and you didn’t either, did you?” He replied, “I’m reading it now.” I said, “ah, good...”. And he said:

“Because he will not let it go...” I said, “wow, but in the morning the document was neoliberal, now, Paulo Renato is the neoliberal par excellence, he will not let it pass, so I no longer understand it.” At that moment, I discovered that we have to deal very frankly with the situation. So they began to disarm because, in the morning, the thing was on the warpath.

Returning to the regional differences in Brazil, we could not predict how the document would get to people’s hands and how it would be interpreted, as we saw so many and so diverse realities. In this country, there are very advanced regions and wise people and, at the same time, people who have never discussed anything, never read a curriculum text or thought about it. Apart from all the political, ideological issues. Education is not a quiet area.

For example, in São Paulo, Rio de Janeiro, and Rio Grande do Sul, there was a curriculum proposal. Some states debated this subject. Naturally, the expected trend was to make a comparison with what they were doing. However, for those who were not doing anything or had not stopped to think about it -and they were plenty-, it was difficult to ask them to present a critical opinion because they did not have a parameter. At most, they were appropriating, after all, this was the first time they had come across certain issues.

It is in this sense that the contribution is. At least there was a curriculum document in these states, and they started discussing this issue. Some asked, “where can we find this Polya’s book[10]?” I replied, “it is at the beginning of the discussion about problem solving, there are many other things, but if you want to read Polya, if you have never read anything by him, then this is a beginning.”

When they received the box, there were many formative courses. We would stay a week and come back again. The *Parameters in Action* course lasted longer, from three to four months, the teams were taking turns, it was a big job.

I now realise that my previous experience as a teacher, especially my experience at CENP[11] , gave me a responsibility and a vast dimension of the work with the parameters that perhaps I would not have had had I only had the school experience.

When I went to work with the parameters, I had a very clear dimension of the difficulty I would face. Perhaps, I did not have such a clear dimension of

10 Pólya, George. (1978). *A Arte de Resolver Problemas*. Interciência.
11 Coordenadoria de Estudos e Normas Pedagógicas (CENP).

the needs in Brazil. It was a shock of reality to go to some places and see such a primitive discussion about the issues. When people realised that we would talk about curriculum, they were baffled. We had to start from a very early point.

It was a totally different experience and much heavier than what I remember from modern mathematics, at the time it was all party, a novelty, everything was very cool.

I feel that we have to welcome the teacher at that time. Perhaps this is the criticism made to the researchers; they will talk to the teachers but do not know their reality. The teachers, on reasonable grounds, point the finger... the researcher, in fact, does not know the dimension of their problems.

### 3. The Parameters: the unexplored history after implementation

We have no studies on the effectiveness of the *Parameters in Action* project. We had some very positive features in the sense of fostering the discussion of the curriculum, not imposing it "down the throat," but [we wanted] to discuss what could be used in schools, the places we could oversee.

The lack of continuity is always the central issue of the curricular discussion in Brazil. Within history, curricula end up being government programmes instead of State programmes. Thus, when the government or the mandate ends, the programme "ends." However, no one has considered the PCNs invalid. Until today people talk about them, but no one else discussed whether what was there was good or bad.

Unlike some other countries, we realised that curriculum implementation is monitored and assessed, and then reforms happen to correct what is not working. In Brazil, there are no parameters for correction. Why isn't it working? We do not know, because, also, we do not know what is working. We don't know anything else. What are they doing at school today? We do not know. Unfortunately, it is not known, it is not monitored, and it is not assessed. Consequently, we are always at baseline.

During my involvement with the PCN, we established some contacts with the people from Portugal who were preparing curriculum proposals. I went to Portugal and spent a month at the ministry of education in an exchange seminar. They showed the Brazilian experience as a successful experience and, later, we saw that this experience did not go forward.

In fact, there is no policy for monitoring or checking the PCNs and/or any other curricular project in Brazil. There is a culture of governments and administrations that is as follows: I published the document, and by publishing the document, my part is done. Or: I published a support material, so it's done! We who work with this know that it is only the first step of a curricular implementation and that it would be a long and arduous process...

We have no answers to questions such as: What happened to the implementation of modern mathematics? What happened to the implementation of material *X*? After all, there was a whole investment in these materials. They may have given good results or not, but we do not know.

Currently, we know that there is an overdose of assessments. Can we say that there is a follow-up or monitoring via assessments? How much of these assessments are compatible with what is in the official curriculum document? Can we agree and be guided by the outcome of the assessment? The answers are not obvious, i.e., they are not scientifically proven. When they say that "the children did very badly at such and such assessment," sometimes, the assessment...

I have already done this work for INEP, the idea was to take an edition of the Basic Education Assessment System (SAEB), a test, and give feedback to the teacher on what could have happened in the test, what they could have done, in short, was to unravel the issue. I had access to SAEB's question bank, and when I analysed it, I realised such absurd questions. I looked at some of them and thought, "what does this question measure?" and "for what does it matter?"

On some occasions, I thought that if the child did not get it right, it was no problem, because the question is so meaningless that the fact that she did not get it right may indicate that the child is intelligent and thought: "I will not answer this nonsense." Thus, we can conclude that the assessment is insufficient to measure how the school is doing.

Going back to the PCNs, I think that we are never one hundred per cent satisfied with every text or material. We always want more! Some issues and advances in the last twenty years did not exist at that time. If I were to write a new document now, it would certainly be different.

After the PCNs, I wrote the Curricular Guidelines for Mathematics for the City Hall of São Paulo and then the material for[12] the EMAI, which is the material of the state department of education. Regarding the PCNs, these two materials have some differences, as the current discussions and trends are naturally incorporated so that I do not perceive the difference between the two, however, they do exist! Some ideas that were put forward are still very pertinent and could be maintained and worked better.

Anyway, it was a very interesting and very funny experience to participate in the elaboration of the parameters because I was praised for having participated but also criticised for what did not work, as if it were someone's or something else's fault. I think this is a question for which we do not have a clear answer, about how the curricular discussion could be done in a way that was not imposing but rather guiding.

## 4. The Parameters: the dissent or consensus?

One of the most complex parts was to create a consensus between the feedback of the secretariats, schools, and reviewers about the curriculum document. First, the reviews sent by the departments of education and those sent by universities were heterogeneous. They are two completely different worlds.

The secretariats analysed how the teacher would understand it, how they would implement it, and what kind of activity they would do. They were doubts from a specific perspective, which is the part that is up to the secretariat, and were in general very pertinent issues. I think they, the secretariats, have brought many interesting contributions for us to think of a more direct and clearer way of writing the document.

University, in turn, did not make a collective but individual analysis because they were researchers *speaking individually*. University had this flaw; they did not analyse the document globally. For example, an opinion was requested, this opinion was made by researcher "x," who analysed only one question covered by his/her research and area of interest and, as he/she knew much about the issue, he/she kept thinking about it over and over and it took such a dimension that we would need ten years for each of those topics to be studied at school or from the perspective of the researcher "x," who is the

12 Educação Matemática nos Anos Inicias.

specialist in that scenario. University has its specialists and, therefore, there is no group analysis. The reviews of the USP group, for example, or the PUC group, were not noticeable. They were too centred on their own concern. For example, imagine that researcher Célia Pires, when analysing the document, looks at the curriculum[13] centred on the discussion of whether it is networked or not, ignoring the rest of the document.

In any case, the contributions are undeniable, and many collaborations were useful, although it is a hard part for those who are preparing the document. We tried to incorporate what was best in that whole discussion... My God! The risk of creating a Frankenstein is enormous! I kept thinking, "isn't that contradictory?" The contradictions begin to pop.

Perhaps by analysing it after a while, we can make a *mea culpa* that the researcher sends a review based on their speciality, without a global analysis. Now, I think this whole event was a learning experience for us. In the discussions about the BNCC (National Common Curricular Base), the great discovery of the MEC was to set up a platform so that any Brazilian citizen could contribute to the document. This is insane!

You don't want to see the result. Obviously, the numbers impress, there were more than a million hits[14]. Ruy's working on it. I wonder what kind of contribution should come in. I asked him what kind of analysis the MEC receives, and he replied, "anything, from global to very specific." Then I asked, "and how is it validated?" And he replied, "we put it all together." They do not know who gave the opinion because it could be anyone, it did not need to be a teacher, it could be a student, even.

At the time of the PCNs, they collected information from 400 institutional reviewers, and it was difficult to draw any idea, so imagine with a

13The collaborator refers to the network curriculum studied in her doctoral studies, whose text was transformed into a book: Pires, C.M.C. *Currículos de Matemática: da Organização Linear à Idéia de Rede. [Mathematics Curricula: from the Linear Organization to the Network Idea*]. São Paulo: FTD, 2000.

14 According to information extracted from the website of the ministry of education, the first version of the document was made available for public consultation between October 2015 and March 2016, having received more than 12 million contributions – from individuals, organisations, and education networks countrywide –, as well as analytical opinions from experts, scientific associations, and members of the academic community.

million, this becomes a surreal statistic! I don't think that's the way. I don't know what the way is, but this one, I don't think it works!

## 5. The Parameters: the need to look back to advance

The PCNs are the main curricular document produced in Brazil. Although it is always a government plan, it is, effectively, the main curriculum document that we managed to produce, even with all its ramifications. Is it a perfect document? It is not! Is it a document you would write? It is not! Every time you join a collective, you give up a few things.

Today I believe that the PCNs contributed to the area. They have an issue that I did not see in the last BNCC document published. I prepared a BNCC analysis document and forwarded it at the request of an organisation. A curriculum document, it must look at what you have, i.e., what already exists. It cannot be very different, far from the reality of teachers who work in the network, so it must dialogue with teachers. On the other hand, it needs to point out a path and an advance. For example, we are here, and we want to get there. I see that the main characteristic of this advance is in contemporary times, i.e., in the document that considers current issues.

The BNCC document talked about things related to research on learning objects. You cannot make a learning object about negative numbers and ignore Georges Glaeser's studies about negative numbers (1985). At the very least, Glaeser, who studied this decades ago, and all the others who succeeded him, must be considered. I feel an obligation to take into account what other people are producing. When writing a curriculum, I also have to consider what has already been produced.

So this document also uses some terminologies that we no longer use because they are outdated, and then some think, "it is for the teacher to understand better." No, the teacher will invest in qualification. Today, to give an example, we are discussing to support the teaching of operations in the theory of the conceptual fields of Vergnaud (1996). Regardless of the researcher's line, this is a matrix that has a lot of adherence, and it really brings very explanatory considerations of the difficulties in some questions that students present.

We should not write a curriculum document for the early years without considering this type of theory. We could mention others and, to the extent that the curriculum document does not address those issues, it does not have the

characteristic of contemporaneity, it helps neither the school nor the teachers to advance.

In this sense, the PCNs proposed, at that moment, what was most present-day. Notoriously, about the National Common Curricular Base (BNCC), they are still present-day and more modern than the Base, although they were made almost two decades ago.

## FINAL IMPRESSIONS

This article brought a thematic fragment built from interviews with professor Célia Maria Carolino Pires at the end of 2016. Our final impressions do not intend to "analyse" the things that were said, as this would be incompatible with our first purpose of bringing the interviewee's thoughts to a broader audience. However, when reviewing those interviews and listening to the recorded audios, we cannot fail to mention the care and affection with which professor Célia always received us and the pleasant hours with a lot of learning we spent with her. There is always the feeling that every time the interviews are revisited, and according to the themes in evidence, multiple approaches will always be possible for each attentive reader and listener.

This article invites us to reflect on the possible articulations between three major themes: (1) mathematics teacher education, (2) the prescribed curricula, and (3) the external assessments. From a historical perspective, we can question how much, in the last 50 years, mathematics teachers have oscillated between the extremes of mere supporting actors to protagonists in the development of mathematics curricula. We can see several aspects of the production of mathematics curricula and other disciplines in Brazil and some federation units. It is interesting to highlight, in terms of public policies, the relationships between what has already been produced in terms of prescribed curricula and what is used to elaborate new curricula. The history of the various curriculum formulations shows us that all of them were identified and assumed as proposals of some government and not as "State" proposals, transcending the limitations of party policies.

The conversation becomes more complex when external assessments start to encourage the production of curricula and intramural mathematics classes activities (but not only mathematics). Teachers and students are reformed to perform, representing numbers that will result in indices to be disclosed to society. And in this sense, external assessments become 'broken thermometers' to measure the temperature of the school organism.

These were some elements that affected us, produced senses, and reverberated in our minds. Therefore, we invite the readers to do this exercise we are doing in our final impressions, considering that a narrative produces meanings, different sensations for each one who comes in contact with it.

## AUTHORSHIP CONTRIBUTIONS STATEMENTS

All authors actively discussed the results, reviewed, and approved the final version of the work.

## DATA AVAILABILITY STATEMENT

The data discussed in the article will be made available upon reasonable request, which will be provided by the plaintiffs.

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