

## A study on the insertion of curricular components of Mathematics Education at UFRN (1978 - 2003)

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### Abstract

This paper has the purpose to talk through the consolidation process of the Teaching component, in the field of Mathematics Education, at UFRN, all over the study of the curricularization process off that field, in the curriculum of the Licentiate Degree in Mathematics course at that academy, considering the time frame from 1978 to 2003. As for the development of the research, we took for granted as theoretical support the assumptions of Cultural History, in particular, Burke (2005) and Le Goff (1990). Therefore, the analytical movement took place through the articulation between written documents (course projects, annals of events) and oral documents (interviews). After triangulation of the data obtained, we acknowledge that the discussions on the teaching of Mathematics within this university, related with the occurrence of academic events in Mathematics Education in the state of RN, among other factors, led up to the consolidation of Teaching at UFRN.

**Keywords:** Mathematics Education. Curriculum. Teacher training. History of Education.

### Um estudo sobre a curricularização da Educação Matemática na UFRN (1978 - 2003)

#### Resumo

Este trabalho tem como objetivo discutir o processo de consolidação do componente Ensino, do campo da Educação Matemática, na UFRN, por meio do estudo do processo de curricularização do referido campo, no curso de Licenciatura em Matemática dessa instituição, considerando o recorte temporal de 1978 a 2003. Quanto ao desenvolvimento das investigações, assumimos como aporte teórico os pressupostos da História Cultural, em particular, Burke (2005) e Le Goff (1990). Para tanto, o movimento analítico ocorreu mediante a articulação entre os documentos escritos (projetos de cursos, anais de eventos) e documentos orais (entrevistas). Após triangulação dos dados obtidos, entendemos que as discussões sobre o ensino de Matemática no âmbito dessa universidade, associadas a ocorrência de eventos acadêmicos de Educação Matemática no estado do RN, entre outros fatores, culminaram para a consolidação do Ensino na UFRN.



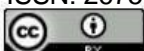
**Palavras-chave:** Educação Matemática. Currículo. Formação de Professores. História da Educação.

## 1 For starters

2 In Brazil, Mathematics Education started its institutionalization process from the late 1980s and, since then, it has been seen as a structuring element in the training of mathematics teachers. In view of this, the study of the incorporation of Mathematics Education in the training of mathematics teachers has been taking place in the researches on History of Mathematics Education in Brazil, namely: research groups such as the Group of Oral History and Mathematics Education (GHOEM), the Research Group of History of Mathematics Education in Brazil (GHEMAT) and, in particular, the Potiguar Group of Studies and Research in History of Mathematics Education (GPEP) in the state of Rio Grande do Norte (RN) mobilize efforts for the construction of a theoretical repertoire about the understanding of the movements of institutionalization of Mathematics Education in Brazil.

In RN, studies generated within the GPEP such as those of Cardoso (2017) and Alves and Gutierre (2014) indicate events that can be understood as belonging to movements towards the consolidation of Mathematics Education in RN, as they point to signs of growth, recognition and valorization of the discussions focused on Mathematics Education in the state.

In view of this, we understand that such studies present and analyze events about the process of institutionalization of Mathematics Education in RN. However, it is important to point out that, following Bazi and Silveira (2007) and Alfonso-Goldfarb and Ferraz (2002), we assume that the process of institutionalization of a scientific field occurs from the consolidation of the four fundamental components of science, namely: teaching, research, dissemination and application of knowledge. Still, in the light of these authors, we understand that the consolidation process occurs when a field presents organization and internal and external recognition. Therefore, we judge, in face of the discussions promoted in the referred researches, that the movement of the incorporation of Mathematics Education in the curricula of Mathematics teacher education, that is, the





study of how the teaching is consolidated, one of the four components previously mentioned, may present important contributions regarding the studies about the institutionalization of Mathematics Education in RN.

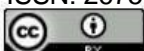
It is worth pointing out that, as Goodson (1997, p. 17) argues, "[...] when we assume the curriculum as a source for historical study, a series of new problems arise (sic), for the curriculum is an illusory and multifaceted concept". Therefore, it is seen, in this perspective, as a social construction and, therefore, much more than a neutral agglomerate of contents. Moreover, we still understand the curriculum "[...] as a field of dispute, under the prism of Pierre Bourdieu" (LIMA; AZEVEDO, 2019). Thus, when we refer to curricularization we want to refer to the political and social movements of incorporation of Mathematics Education in the written curriculum, i.e., here, we will analyze the incorporation of curricular components in the written curriculum of the Undergraduate Degree in Mathematics of UFRN.

Furthermore, we consider it pertinent to highlight our understanding of Mathematics Education as a research field. We will try, therefore, to point out some of our understandings about it. We conceive Mathematics Education as an interdisciplinary field that, according to Bicudo (2013) "[...] presents itself as a complex area of action, because it brings, in a structural way, in its constitutive core, Mathematics and Education with their specificities".

With regard to his object of study, Bicudo (2016) tells us that

the object of Mathematics Education is constituted by the junction of Education and Mathematics. It is not a matter of a sum or of looking at it from perspectives of Education, Mathematics or other Human Sciences, but of understanding it as being always already constituted in this interdisciplinary junction. Therefore, its interdisciplinarity does not come from the meeting of diverse disciplines, but from its own constitution (BICUDO, 2016, p. 303).

In particular, this article reports some events that we consider as belonging to the aforementioned curricularization of Mathematics Education in the courses of Mathematics Teacher Education at the Federal University of Rio Grande do Norte (UFRN), in the period between the years 1978 and 2003. This time frame is justified, because we





observed, in the course of this investigative journey, that Professor Marlúcia Oliveira de Santana Varela had a crucial participation in the precursor events of the consolidation of Mathematics Education at UFRN. Thus, we consider her joining the faculty of the institution in 1978 as an important milestone in this process. On the other hand, we delimited 2003 as the final mark of our cut, because in that year a new curricular structure of the university's Mathematics Education course came into effect, with a strong presence of Mathematics Education, as can be seen in several compulsory courses of the area contained in this structure.

In view of this, this paper aims to present a narrative from the indications of the curricularization of Mathematics Education at UFRN, through the triangulation of information obtained in analyses of the curricular structures elaborated and in force in this period and from interviews with professors who actively participated in this process of consolidation of Mathematics Education at UFRN.

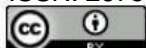
We emphasize that our view of the events presented in this study considered that the movement established in favor of the mentioned curricularization is not peaceful, since it involves internal and external disputes for power and legitimacy.

Thus, considering these points, we agree with Bourdieu (1983) who argues that scientific fields are constituted in the midst of power relations. In this sense, the author states that:

The universe of the purest science is a field like any other, with its power relations and monopolies, its struggles, strategies, interests and profits [...] mischaracterizing the possibility of a neutral science, interested only in its progress (BOURDIEU, 1983, p. 123).

In fact, some studies expose the power relations that make up these movements of epistemological and political legitimacy in scientific areas, particularly in Mathematics Education.

It is also pertinent to highlight that we consider the assumptions of Cultural History in our analyses, in particular Burke (2005) and Le Goff (1990). Thus, we understand that contextual, political and social relations are inseparable in the process of





historiographical investigation. Thus, we will present below a brief sociopolitical contextualization of the time, as well as some conceptions about mathematics education that were in force in that context.

In Brazil, we know that the years that followed the notorious coup of April 1964 were, no doubt, difficult and troubled. In that year, we had the beginning of a dictatorial regime in our country, which lasted until 1985 and reflected in the most diverse social spheres, including Education.

Characteristics such as censorship, control, and repression are hallmarks of dictatorial regimes and, therefore, were present in Education at that time. In this regard, Azevedo et al. (2012) and Fiorentini (1995) tell us that the 1970s were marked by the strong presence of a technicist teaching, characterized by the presence of a knowledge-transmitting teacher and a passive student who only listened and absorbed what was taught. In this context, the teaching of mathematics was, in general, merely expository and marked by the Modern Mathematics Movement. Therefore, it was a teaching focused on the memorization of rules and properties. Thus, the curriculum of the courses that qualified people to teach Mathematics in Basic Education, was scarce of subjects that provoked reflections about the teaching of Mathematics.

## 2 About the chosen methodological path

This research has a bibliographic-documentary characteristic and assumes the methodological assumptions of qualitative research, which, according to Garnica (2001, p. 42) "[...] is a fluid, vibrant, living medium and, therefore, impossible to be bound by fixed parameters, similar to legislation, norms, formally pre-fixed actions". Moreover, in accordance with Burke (2005), we also understand that historiographical activity "intrinsically carries the characteristic of an interpretative action and that, therefore, it is anchored in ideologies and interests of different social groups" (ANJOS, 2018, p. 18).

Inspired by the studies of Ginzburg (1989), we strive to analyze the events in the light of the indicia paradigm, that is, we cast our gaze on the details and minutiae





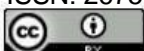
shrouded in the reported episodes and analyzed documents. Thus, when we talk about clues, we are referring to the nuances and subtleties present in the historical events narrated.

Evidently, in face of this exercise, the analytical movement occurred through the articulation between written documents (course projects, annals of events) and oral documents (interviews), which, through comings and goings, promoted a dialogue between these documents. Thus, the methodological path was inspired by the Triangulation method (BRISOLA; MARCONDES, 2012), i.e., constructed by interweaving diverse methodologies, which enabled a critical reading of the events that permeate the historical events that make up the movements of creation and implementation of curricular components focused on Mathematics Education in teacher training courses in this area.

In this perspective, when we reflect on the interview of Professor Marlúcia, for example, we observe that she spoke about the annals of the III National Meeting of Mathematics Education, highlighting it as an important milestone in the consolidation of Mathematics Education in RN. Based on this account, we searched these annals and found interesting information related to decisions approved about the curriculum of the courses for Mathematics Education. In this way, we can put this information in dialog with the curricularization of Mathematics Education at UFRN. This exercise was also done with the interview of Professor José Querginaldo Bezerra. We will discuss these interviews and other developments in the next section.

We would also like to point out that we decided to interview Professors Querginaldo and Marlúcia because they were mentioned by Professor John Andrew Fossa, in an interview given to Oliveira and Anjos (2020), as important characters in the process of constitution of Mathematics Education at UFRN

I started to get interested in Mathematics Education, when I was invited to participate in a specialization course. Professor Claudemir was the first Coordinator. Professor Sebastião and Professor Querginaldo were involved, plus some other people, - I do not like to mention people by name, because I always forget some! (OLIVEIRA; ANJOS, 2020, p. 177).







But I remember that there are, in the life of the Mathematics Department, many interesting people who were concerned with the teaching of mathematics. I have already mentioned Claudemir and Sebastião. Another one would be Marlúcia (OLIVEIRA; ANJOS, 2020, p. 181).

As for the interviews, we emphasize that, in general terms, we follow the suggestions of Silva (2006), who points out the need to produce scripts that allow the interviewees to report their memories.

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### 3 Triangulating and discussing indications and evidence

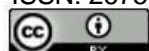
In this section we will expose, discuss and triangulate (1) information from the written documents we had access to with (2) part of the content of the interviews conducted with professors who were involved in events that we understand to be founders of a consolidation movement of Mathematics Education, as to the Teaching component, within the UFRN.

One of the characters we interviewed was Professor José Querginaldo Bezerra, who joined UFRN in 1986 and works at the Department of Mathematics (DMAT) of this institution and in the Mathematics courses, particularly the undergraduate course, until today. Another interviewee was Professor Marlúcia Oliveira de Santana Varela, who worked in the DMAT at UFRN from 1978 to the early 2000s, as well as in the undergraduate mathematics course at UFRN.

Professor Marlúcia studied Mathematics at UFRN in the early 1970s and told us that at that time there was a clear segregation between the Education and Mathematics components, there was no dialogue or intersection between these areas.

The disciplines were separate, the mathematics department gave their mathematics disciplines and the education department, who gave the disciplines in the area of education. It was something totally watertight (VARELA, interview granted, May 27, 2016.).

Therefore, there was no Mathematics Education in the perspective of Bicudo (2013; 2016), previously presented.



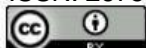


On the other hand, still according to the interviewee, at the end of that decade, a concern began on the part of some teachers of that institution regarding the discussion on the teaching of Mathematics. Marlúcia herself revealed to us that, still at that time, she was teaching both at the Federal University of Rio Grande do Norte and in the public system of RN, therefore, she was experiencing in practice the teaching of Mathematics. Throughout this experience a feeling of concern about "how to teach" and the meaning of mathematical concepts began to emerge. In this sense, she pointed out some names of teachers who came to her mind at the time of the interview and who were also imbued with this feeling, namely: Antônio Pinheiro de Araújo and João Faustino Ferreira Neto. Both professors were in the Department of Education at UFRN. These professors mediated the discussions about the teaching of mathematics with the undergraduate students of this course and realized that the doubts of these students demanded from the teacher a more specific training, that is, in the area of mathematics.

This scenario, together with other events, later led to a change in the attitude towards the courses offered in the Mathematics course at UFRN, since teachers from DMAT were assigned to the Department of Education to teach courses in which issues related to Mathematics teaching were discussed.

When I worked it was like it was assigned to education, the code was from education, right? It was part of our math curriculum, I don't know how it was organized afterwards, but it was part of our curriculum to pay for those disciplines there in the education department (VARELA, interview granted, 05/27/2021).

In view of this, we can observe that although the curriculum of the course remained the same and these courses continued to be offered by the Department of Education, in practice, a significant change was occurring, since a dialogue between Mathematics and Education began to take place, as well as an improvement in the understanding that was held about these courses. We can also say that this event reveals indications of an internal organization towards consolidation.







It is fundamental to point out that if we consider isolatedly the interviews, the cooperation between Mathematics and Education teachers, and the cooperation between academic and Basic Education teachers, we have a naive impression that all the factors were contributing to the development of the area of Mathematics Education. However, as we have already mentioned above, the movements of change in scientific fields do not occur in a peaceful way (BOURDIEU, 1983), and considering that the vision of teaching during this period was technicist, we assume that many professors did not consider these discussions about Mathematics teaching as relevant for the improvement of the Mathematics course.

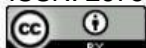
The change of attitude of some faculty members, however, was initially driven by the occurrence of academic events that started to take place at that time and that had the purpose of discussing the teaching of mathematics. Some DMAT teachers were also involved in these events, such as Professor Marlúcia herself, Professor Querginaldo, and Professor Manuel Claudemir Silva Caldas, as well as, later on, Professor John Andrew Fossa, as stated by the interviewee

So, there was already a group of teachers from the state [interested in these discussions about mathematics teaching], why? What encouraged this? The events that were promoted. And we went [to these events]. We went to the south of Brazil, some professors from the university also... Professor Claudemir, Professor Querginaldo, at that time they paid attention to this as well. Then came Professor John Fossa (VARELA, interview granted, 05/27/2021).

These points made by Professor Marlúcia converge with what Professor Querginaldo told us in an interview:

As soon as I graduated I was hired by UFPB, where I worked for 8 years, returning to UFRN in 1986. I got my master's degree in mathematics at UnB, in 1981, in an area called Harmonic Analysis, with few researchers in Brazil and in the world.. **From then on I devoted myself to the issues of mathematics education**, although I have not done a PhD in this area, despite frequent motivations from colleagues at DMAT (BEZERRA, interview granted, 05/25/2021, emphasis added).

Thus, it is possible to observe indications that this emerging concern with the teaching of mathematics triggered the occurrence of academic and/or scientific events





that were attended by teachers from both the university and the state who were interested in the subject:

It's... the Gatherings have begun... Mathematics Meeting... Mathematics Teaching Conference... Mathematics Education Conference... I was just quickly looking for a book, that here in Natal hosted a big Mathematics Education Meeting, and I was one of those who helped a lot (VARELA, interview granted, 05/27/2021).

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The book of the meeting to which the teacher was referring is the Annals of the III National Meeting of Mathematics Education (III ENEM), currently the largest event of the area in Brazil. The mentioned edition took place between July 22 and 27, 1990, at the Federal University of Rio Grande Norte and counted, among external professors and students, with the support of professors from the institution in the organizing committee, acting in the following subdivisions:

**Table 01** - UFRN faculty members who served on the organizing committee of the III ENEM.

General Coordination	Antônio Pinheiro de Araújo
Executive Coordination	Marlúcia Oliveira de Santana Varela
Scientific Committee	Antônio Pinheiro de Araújo John Andrew Fossa
Secretary Committee	Iloneide Carlos de Oliveira Ramos Maria Elizabete Dantas de Farias Osvalita Rodrigues Pinheiro
Finance Committee	Antônio Pinheiro de Araújo Francisco Canindé de Oliveira Ivanoska de Lucena Galvão
Reception-dissemination and social promotion committee	Manuel Claudemir Silva Caldas
Health-food and housing committee	Francisco Gurgel de Melo Freitas José Querginaldo Bezerra Márcia Maria Castro Cruz Sônia Maria Cavalcanti da Rocha

**Source:** Prepared by the authors based on data from the Annals of the III ENEM.

It is possible to note, therefore, that the event was attended by a significant number of teachers who were probably interested in issues related to mathematics teaching. In addition, this event was a milestone in Mathematics Education in the state, since there was a sharing of information and experiences about Mathematics teaching, as well as a sharing of research results in the area that were being carried out in the country at that time. Also in the interview, Professor Marlúcia Varela told us that





researchers from several states in Brazil came "[...] contributing, giving lectures, conferences, meetings and networking" (VARELA, interview granted, May 27, 2021). Therefore, we can say that there was a great contribution to the discussions that took place locally and that these discussions had an impact on the written curriculum, because, as stated in the proceedings of this event, in the tenth chapter entitled "Deliberations of the III ENEM"

The General Assembly of the Brazilian Society for Mathematics Education, meeting on July 27, 1990 in the auditorium of the Rector of the UFRN, in Natal, RN, decides unanimously to approve the following deliberations of the Working Groups meeting during the III ENEM (ENCONTRO NACIONAL DE EDUCAÇÃO MATEMÁTICA, 1990, p. 255).

Among these deliberations, in a section titled "About Undergraduate Degrees," is the following:

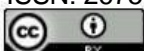
**L3 - That it be incorporated into the curricula of Mathematics graduates:**

- a. a. in-depth knowledge of the reality of today's education by placing it in the social context;
- b. **b. disciplines in the area of Mathematics Education, contemplating critical knowledge of alternative proposals and new teaching methodologies and the objectives of Mathematics teaching;** (NATIONAL MEETING ON MATHEMATICS EDUCATION, 1990, p. 255, our emphasis).

In this perspective, it is possible to notice that the III National Meeting of Mathematics Education, in Potiguar soil, contributed to the maturation of the discussions about Mathematics Education, which later evolved to Mathematics Education.

Besides the historical episodes mentioned above, we also highlight the exchanges made by Professor José Querginaldo during the process of implementation of the Mathematics Teaching Laboratory (LEM) at UFRN:

I contributed to the creation of the Math Workshop and was responsible for its expansion and installation in the room it is in today. I promoted the exchange with several laboratories in the country, bringing specialists or visiting other institutions. Besides the visits I made to laboratories in UFPB, UFPE and USP, I highlight PUC/RS, where I did a one-week training course.).





In this regard, it is possible to observe that activities of exchange and dissemination of knowledge in Mathematics Education have been carried out through the LEM at least since 1988

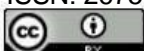
In 1988, the Laboratory for Mathematics Teaching participated, together with the Laboratory for Teaching and Research of Scientific Learning (LEPAC) of the Federal University of Paraíba, in the annual meeting of the Brazilian Society for the Advancement of Science (SBPC), held in Natal, with a very successful interactive exhibition. Since 1997, the Mathematics Teaching Laboratory has participated in the Science and Technology Fair (CIENTEC) promoting the exhibition of various materials for pedagogical use (UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE, 2013, p. 8).

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In this way, we can say that by the 1990s there was already an incisive movement towards a consolidation of the area. The consolidation movement of the Teaching component occurs in parallel and integrated to the other components, in particular, the development of Research strongly impacts the events regarding teaching.

In addition, we consider it relevant to point out that within our time frame, we had access to three curricula of the Mathematics Degree course at UFRN, dated from 1981, 1998 and 2003. Analyzing these curricular structures, it is clear that in 1998 there was an increase in the number of curricular components of Mathematics Education in relation to the previous structure. To this fact, we can establish a relationship with the events portrayed previously, as well as, with two events pointed out by Cardoso (2017), namely: the development of studies related to the teaching of Mathematics and the entry of doctoral professor John Andrew Fossa at UFRN.

Still considering Cardoso's (2017) indications, Professor Fossa obtained his PhD degree in Mathematics Education in 1994. In the following year, 1995, he joined the faculty of the Graduate Program in Education at UFRN (PPGEd/UFRN) and, therefore, to guide and develop research in Mathematics Education. It is important to remember that he was involved in the process of creating the Mathematics Education Research Line in that Program, as Cardoso (2017) points out. According to the author, until the year 1996, there was only one vacancy (occupied by Professor Fossa) for faculty with a background in Mathematics Education, however, he convinced the DMAT to open another one. Thus, the following year, professor Bernadete Barbosa Morey joined the faculty.



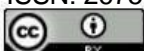


Thus, we can conjecture that this increase in the number of components in the curricular structure in effect from 1998 is also related to the entry of the mentioned professors and to the increase of research in Mathematics Education in this institution from 1995 to 1998, driven by the creation of the Research Line in Mathematics Education. Later on, the gradual strengthening of this organization can be observed with the entry of professor Arlete de Jesus Brito in 1999, as well as, with the emergence of other research groups in Mathematics Education, created from 2002 on, as Cardoso (2017) points out.

Given the above and analyzed in this section, we can see that the area of Mathematics Education, as to the Teaching component, began to have a strengthening within the Federal University of Rio Grande do Norte in the 1990s and this process occurred mainly through events such as the occurrence of academic events in the state of RN, highlighting here the III ENEM, articulated with the mobilization of discussions about the teaching of mathematics among teachers of Mathematics and Education, of this institution, as well as the creation of the LEM of UFRN. Moreover, it is notable that these movements occurred linked to the strengthening of the Research and Dissemination of Knowledge components of Mathematics Education at the university, since the development of these scientific components occurs in a concomitant and integrated manner. Thus, we understand that the set of these historical events caused changes in the curricular structure of the BSc course in Mathematics of this institution, which can be noticed from 1998 on.

## 4 Final considerations

Our goal was to investigate the curricularization of Mathematics Education at UFRN between 1978 and 2003. After triangulating the data obtained in interviews with information present in primary sources, we can conclude that the process of consolidation of Mathematics Education at UFRN is inserted in a complex context, since many factors acted in this consolidation movement. Evidently, this paper does not intend to deal with





all of them, so we remind you that in our analyses we turned to the events surrounding the consolidation of the Teaching component, of Mathematics Education, at UFRN, under which our study pointed to some events that indicate the emergence of a feeling of concern on the part of teachers from both the Department of Education and DMAT as a precursor of this movement at the university. Such sentiment spurred some discussions about mathematics teaching in the state, and they certainly did not emerge suddenly and disconnected from a broader context. We emphasize, again, the technician context and the spread of Modern Mathematics throughout the country at the time.

Moreover, the occurrence of events in the area, especially the III ENEM, may have helped to improve the knowledge in the area at the time, since, after the meeting, there was a meeting to formalize the insertion of curricular components related to Mathematics Education in the curricula of undergraduate Mathematics courses.

Therefore, we can say that the consolidation of the Teaching component of the field of Mathematics Education in Rio Grande do Norte was driven by the movement that was occurring nationally, and that its curricularization at UFRN had as a precursor historical events of different natures, but that, together, culminated in a movement of internal consolidation. Thus, at UFRN, we found that the Teaching component of the Mathematics Education field is consolidated.

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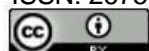
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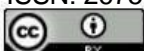
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