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## Teacher education and mathematics teaching: a history of the Pedagogy course at FE/UERN

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### Formação docente e ensino de matemática: uma história do curso de Pedagogia da FE/UERN

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#### Abstract

With this article, we aim to analyze historically the process of teacher training to teach mathematics in the primary school offered by the degree course in Pedagogy at the Faculty of Education, State University of Rio Grande do Norte (FE/UERN), from its creation in 1966. For this purpose, we developed a historiographic research based on official documents, references and institutional curriculum archives, mainly disciplinary programs. The results point to the existence of three historical moments when addressing the offer of training aimed at teaching mathematics, temporally marked by the years 1967, 1995 and 2007. It is also possible to indicate that, at least in the last two decades, the course sought to provide training based on social, critical and constructivist issues, paying attention to the guidelines present in the training regulation documents and in recent scientific studies.

**Keywords:** Education of the pedagogue; history of mathematics education; curriculum; multipurpose teacher.

#### Resumo

Com este artigo, pretendemos analisar historicamente o processo de formação docente para atuar no ensino de matemática nos anos iniciais ofertado pelo curso de licenciatura em Pedagogia da Faculdade de Educação da Universidade do Estado do Rio Grande do Norte (FE/UERN), a partir de sua criação em 1966. Para isso, desenvolvemos uma operação historiográfica pautada em documentos oficiais, referenciais e arquivos curriculares institucionais, principalmente programas de disciplinas. Os resultados apontam a existência de três momentos históricos que dividem o percurso formativo do curso para ofertar uma formação voltada ao ensino de matemática, marcado temporalmente pelos anos de 1967, 1995 e 2007. Ainda, é possível indicar que, ao menos nas duas últimas décadas, o curso buscou propiciar uma formação pautado em questões sociais, críticas e construtivistas, atentando às orientações presentes nos documentos de regulamentação da formação e em estudos científicos recentes.

**Palavras-chave:** Formação do pedagogo; história da educação matemática; currículo; professor polivalente.

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**Submitted on:** 13/12/2021 – **Accepted on:** 04/02/2022 – **Published on:** 23/05/2022

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## Introduction

Teacher education has long been the subject of studies and discussions by researchers who offer fundamental elements to propose a reflection on the processes experienced in undergraduate courses. The present work presents elements that discuss the teacher education process of educators for the teaching of mathematics in the initial years, presenting a historical look at the undergraduate course in Pedagogy of the School of Education (SE), of the *Universidade do Estado do Rio Grande do Norte* (UERN). For this, we established as a research problem the following question: How has the Pedagogy course of the SE/UERN been historically training multivalent teachers to teach mathematics in the initial years?

Thus, it is defined as the general objective of the work to analyze historically the process of teachers' formation to act in the teaching of mathematics in the initial years offered by the Pedagogy graduation course of FE/UERN, since its creation in 1966. To achieve the outlined objective, a historiographical operation was developed based on Oral History as a research methodology (Garnica, Fernandes & Silva, 2011; Garnica & Souza, 2012).

For this article, however, we will focus on the analysis of the curriculum documents that were produced from this research, since we work with a conception of History, within which we make use of various sources (oral, pictorial, iconographic, written, etc.) that can be used to develop historiographic research and make possible to produce, or produce, narratives by themselves (Garnica, 2013). We understand that the movement of documentary analysis allows resorting to the "treatment of diverse sources such as reports, newspapers, photographs, tables, official documents, etc." (Fonseca, 2002, p. 32), based on the perspective of the non-neutrality of documents and the weaving of history and the meanings elaborated for its construction in a subjective way (Albuquerque Jr., 2009; 2015).

From this historiographical exercise, it was possible to constitute a historical version based, besides official and referential documents, on the following files: General Program of the Subjects Elements of Mathematics - offered between 1982 and 1995 -, Teaching of Mathematics I (from the semesters 2000.2, 2006. 1, 2008.1 and 2009.1) and Teaching of mathematics II (semesters 2000.2, 2005.1 and 2007.2) - these last ones offered in the curricular matrix of 1995 and 2006 -, and the General Program of the Curricular Component Teaching of mathematics (semesters 2010.1, 2011.1, 2014.1 and 2021.1) - offered in the matrix in force since 2007. These documents were accessed from the SE/UERN website, provided by the Education Department of this unit or found in the Central Archive of UERN.

The locus chosen for the development of this study is relevant in the state and regional scenario as regards the training of professionals to work in the teaching of the early years of elementary school. The Faculty of Education of UERN, which was founded in 1966 and began its operation in 1967, has been training a large number of professionals every semester, who work in various sectors and not only in Rio Grande do Norte (Costa, 2014).

In the sequence of this text, we present some historical understandings and legal foundations about the formation of teachers to act in the teaching of the initial years; next, we present our analysis of the curricular documents of the Pedagogy course and; finally, we

point out some possible understandings from the investigation described here.

## **Legal and curricular fundamentals of the course of Pedagogy in Brazil**

To discuss the historical course of the Pedagogy Program in Brazil is a central aspect to understanding the trajectory covered for the formation of the pedagogical professionals, the characteristics that led to the appearance and development of the course in our country, as well as the scenario of resolutions that directed the educative practices to form this professional, seeing the "pedagogy as reflective, formative and emancipatory activity, proposing to form subjects in and by the praxis" (Lima, 2011, p. 43).

Initially, the "Pedagogy course was regulated in our country by occasion of the organization of the National College of Philosophy, of the University of Brazil, through the Decree-Law number 1.190 of April 04, 1939" (Lima, 2011, p. 23), its intentionality was constituted in forming bachelor educators and graduates to act in several areas of the Education Sciences.

In this context, initial training was constituted at the bachelor level and was intended to disciplines based on several areas, directing the look to the fields of social sciences, natural and humanities, for example, disciplines such as Sociology, Biological Foundations of Education, History and Philosophy and Educational Psychology, thus, had an opening of understanding to these large areas of the scientific field, to act in management, guidance, technical supervision, emphasizing that students would receive guidance and activities of technical basis in a fragmented way (Santos, 2009).

After the first three years of the bachelor's degree, the fourth and last year of the course was geared to the formation of undergraduates, who could later become teachers (Santos, 2009). This curricular organization of the initial Pedagogy course became widely known as the 3+1 scheme (Lima, 2011), the student spent three years in the bachelor's degree and one more year in the licentiate, so that he or she could exercise the activities competent to the professional of Pedagogy (Brzezinski, 1996).

After this formation, the pedagogue could exercise the profession in the classroom at the Normal Schools, in conformity with the Decree/Law 1. 190 of April 04, 1939, however, Brzezinski (1996) affirms that the curriculum itself did not present the necessary contents for that, criticizing the contradictory demands, exposing that the learning of the contents in the Pedagogy course occurred only in the professional ambit of the classroom, in a theoretical way, with no practical activities such as, for example, the supervised internships or pedagogic practices in the fields of performance.

It is pointed out that this perspective of formation was extended for a long historical period because in "1961, the 3+1 scheme was still used" (Brzezinski, 1996, p. 54). Only at the end of 1961, with the approval of the first Law of Directives and Bases of National Education (*Lei de Diretrizes e Bases da Educação Nacional LDBEN*), Law no. 4.024 of December 20, 1961, which presented a proposal in face of the contemporary demands experienced by the Brazilian society at the time, with an educational system that promoted access to education, and provided for the maintenance of basic education and teacher training

(Law, 1961), other studies on the formation and constitution of the course in Brazil were initiated and proposals for the teacher training of Pedagogues were elaborated.

Together with the LDBEN, we highlight the institution of the Federal Council of Education (*Conselho Federal de Educação* CFE), created to act in the formation and evaluation of the national education policy. With its attributions, the CFE sought to put into practice the establishment of a minimum curriculum for teacher education in higher education courses (Lima, 2011, p. 24). However, it is possible to note the continuation of what was previously being done, where the curriculum seemed little elaborated in the legal aspect, making it impossible for greater changes to occur.

As of Law no. 5. 692, of August 11, 1971, which presented changes to the LDBEN, there were some changes in basic education in Brazil, among these changes is the extinction of the Normal Schools and the requirement of teacher training through the teaching profession and its qualifications, also bringing some changes in the training of teachers to work in the first grades of basic education, The curriculum itself, for example, did not focus on the contents and subjects in order to prepare teachers for professional life in the classroom context, only in the broad training, i.e., there was no work directed to develop activities with specific subjects such as Portuguese, mathematics, science, geography, etc. With the enactment of this law, some connections between theories and practices were established to deal with the subjects involving the educational policy and structure and its importance (Gatti & Barretto, 2009).

What can be highlighted in the 1980s is a small advance in the field of teacher training from 1982 onwards, with the creation of the Specific Centers for Teacher Training and Improvement (*Centros Específicos de Formação e Aperfeiçoamento ao Magistério* CEFAMS), which enabled improvements in teacher training for the early years (Gatti & Barretto, 2009). 044 of October 18, 1982, with changes in Law # 5.692/71, which provided specific training for teaching in the early and final years of elementary education (Gatti & Barretto, 2009).

We can see an initial process of organization of the Pedagogy course in a fragmented way, by the offering of disciplines established in a technical way (Gatti & Barretto, 2009). From the 1980s on, we see some advances in the curricular structuring of the Brazilian basic education and the teacher education, which later, in the 1990s, starts to be developed by the modifications present in the access and operation of education, established by the changes proposed and reformulated in the new LDB.

The Law of Directives and Bases of Education (LDBEN), promulgated on December 23, 1996, n° 9.394 (Law, 1996), legally bases national education to this day, along with the normatizations of the Federal Council of Education (*Conselho Federal de Educação* CFE), which direct teaching and fundamental competencies as to the professional training of pedagogues, proposing directions to the curricula, which involves "political, social and economic interests of a time" (Santos, 2009, p. 51). Despite the new law, in what refers to the

curricular organization, a strong presence of the previous legislations with fragmentation and technicism to teaching is perceived (Gatti & Barretto, 2009).

It is important to highlight some points present in the new Law of Directives and Bases of Education, such as the need for higher-level teacher training for basic education, present in Art. It is important to emphasize some points in the new Law of Directives and Bases for Education, such as: the need for higher-level teacher training for basic education, as stated in Art. 62, the obligation of educational institutions that offer normal education courses to establish theoretical and practical elements to qualify the educator for the exercise of the profession and that are supported by Brazilian regulations, and, above all, the need for continued education for these education professionals, as stated in Art. 63, I and III (Law, 1996), to enable the improvement of issues faced in the classroom.

In the 2000s, more precisely in 2002, we see the creation of the National Curricular Guidelines for Basic Education Teacher Training, which direct teachers from initial training in higher education courses to professional practice in the basic education network (Gatti & Barretto, 2009). This document highlights the importance of the intertwining of theory and practice within the curricular organization, and the experiences between college and school as a permanent learning link, as a way to guide education professionals.

This aspect is emphasized in the resolution of the National Education Council CNE/CP N° 1, of May 15, 2006, which established the National Curricular Guidelines for the Undergraduate Course in Pedagogy, in its Article 3. This same resolution attributes to the pedagogue the functions of a licensee to act in pre-school education and the initial years of elementary school, in high school in the Normal modality, in the Education of Young People and Adults (*Educação de Jovens e Adultos EJA*) and also in the management of educational processes (Resolution, 2006). Therefore, it is noted that "the curricular complexity for this course is great" (Gatti & Barretto, 2009, p. 49), since the profession becomes multifaceted and the training requires an approach to several fields, with a curriculum that extends to the "philosophical, historical, anthropological, environmental-ecological, psychological, linguistic, sociological, political, economic and cultural knowledge" (Gatti & Barretto, 2009, p. 49).

Although the history of the formation of educators follows with much more recent alterations, we will not approach them in this text, considering that they do not imply directly in the studied object.

## **The Pedagogy course at FE/UERN and the formation to teach mathematics**

The creation of the Universidade Regional do Rio Grande do Norte (URRN) occurred on September 28, 1968, by Municipal Law No. 20/68, linked to the Fundação Universidade Regional do Rio Grande do Norte (FURRN), and currently receives the name of Universidade do Estado do Rio Grande do Norte (UERN), linked to the State Government of our State (UERN, 2020).

The undergraduate course in Pedagogy was created through resolution 126/66 - CEE, of November 16, 1966, linked to the Faculdade de Filosofia, Ciências e Letras de Mossoró (Faculty of Philosophy, Sciences and Letters of Mossoró) (FAFICIL), which was later dismembered, establishing the Institute of Education of Mossoró, which later became the Faculty of Education of UERN. From September 28, 1967, with the due opinions for operation, didactic materials and infrastructure to enable teaching, as well as teaching staff, the didactic and administrative activities of the Pedagogy course in Mossoró were initiated (Costa, 2014).

The Pedagogy Course offered by SE/UERN began in 1967 with a class of School Administration and, later, began to offer the Study of Disciplines and Practical Activities. It was recognized by Decree nº 72.263, of May 15th, 1973, with the qualifications Teaching of Pedagogical Subjects of the 1st Grade and School Administration of the 1st Grade. The following year, in 1974, it also began to offer the qualification in School Supervision and, four years later, in 1978, the qualification in Educational Guidance (UERN, 2019; Costa, 2014).

Since the appearance of these qualifications in the Pedagogy course, there were discussions to occur curricular reorganizations, which effectively occurred only in 1994 and "it was conceived that in 1995 the Pedagogy course started to offer qualification in Teaching in Early Childhood Education and Initial Series" (Costa, 2014, p. 23).

In what refers to the most recent processes of reformulation and curricular updating, the last changes in the Pedagogy course of SE/UERN occurred from discussions initiated in the year 2006, "through studies, debates, lectures and other academic meetings gaining strength in the beginning of 2007 and consolidating" (PPC/Pedagogy, UERN, 2012, p. 6), being followed by new updates and recognitions by the State Council of Education (CEE) in the years 2012 and 2019, keeping the structure as thought in 2007 (Oliveira, 2016).

Specifically, regarding the teaching of mathematics, we emphasize that the documents found are limited and with fragile information about the structuring carried out over the years, but they reveal some historical processes even without presenting greater details. We corroborate with Costa (2014) when he states that there is a lack of written documents that narrate about the FE/UERN and its operation trajectory, especially when we seek information referring to the initial period of operation of the college.

The documentary records that we had access show only some historical elements, leaving evidence of changes with the implementation of new curricular perspectives, following the guidelines of the legal documents, i.e., we present notably disciplinary programs concerning the teaching of mathematics, as a way to shed light on the topic at hand. In this direction from constant data in the site of the SE/UERN, it is possible to recompose, in part, the curricular matrix of the Pedagogy course offered between the years of 1982 and 1994, having information of only some of the semesters of the curricular organization, but, among these, what called our attention is the discipline Elements of Mathematics that was worked in the Pedagogy course.



DOI: 10.20396/zet.v30i00.8667891

From the General Program of the Subject (PGD)<sup>3</sup> Elements of Mathematics, offered in the first period of the course, it is possible to know that this subject had a workload of 75 hours. It was not a component about the teaching of mathematics, but a component that dealt with an elementary knowledge of mathematics, offered by the Department of Mathematics and Statistics (DMS) of the Institute of Exact and Natural Sciences (ICEN) at the time.

The course units were divided into five and provided for the possibility of being mediated by ten professors from the Department of Mathematics and Statistics of UERN. The objectives presented an approach aligned to the mathematical contents, pointing out the interest in overcoming the difficulties experienced especially in 1st and 2nd grade teaching, i.e., it sought to review/strengthen the mathematical contents of the current Basic Education. It brings concepts and discussions around problem solving, number operations, sets, relative numbers, algebraic and radical expressions, potentialization, 1st and 2nd grade equations, and inequalities. We emphasize that the PGD does not contain methodological and evaluative aspects, as well as the theoretical references that were discussed during the discipline, worked in the matrix that was in effect until 1994.

We could not find any other documental records that pointed to the existence of other disciplines related to mathematics in any of the qualifications. However, we suppose that, at least in the Qualification for the Teaching of Subjects and Practical Activities of the Normal Courses (EDA-PE), there should be some component aimed at working on issues related to the teaching of mathematics, considering that it was one of the training subjects in the Teaching courses offered at the time in high school.

From 1995 on, however, the Pedagogy course at SE/UERN changed with the curricular reformulation, offering only one qualification - Teaching Children Education and Initial Series - which had the disciplines of Mathematics Teaching I and II, offered in the 6th and 7th periods, respectively, with a class load of 75 hours for theoretical and practical discussions. It is worth noting the removal of the Elements of Mathematics component from this new organization.

The oldest PGD we have access to about these components dates from the semester 2000.2 (probably the first offerings occurred in 1998 since the curriculum was implemented in 1995/1996). The subject Teaching of Mathematics I addresses in its menu: Study of the teaching of mathematics in the early years of elementary school, considering the logical, historical, cultural, and pedagogical aspects involved in the process of appropriation of school mathematical knowledge. Formation of basic concepts by the students regarding numbers, numbering system, fundamental operations (addition, subtraction, multiplication, and division).

We can notice the orientation to work with mathematics in the early years of elementary school so that the students could understand the contents to mediate later. In

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<sup>3</sup> All the General Program of the Subjects and the General Program of the Curricular Components that will be referenced here can be accessed in Author's appendix (2021).

DOI: 10.20396/zet.v30i00.8667891

addition, the expression "appropriation of knowledge" that appears in the syllabus draws attention, pointing to a certain distance from the constructivist notion of knowledge.

In the same semester, the subject Teaching of Mathematics I sought to build theoretical bases to think about the teaching of mathematics in the early years of elementary school, from which we can see that the syllabus discussed mathematical concepts, such as numbers and the numbering system, and the four basic operations, problem solving, in addition to promoting discussions about the teaching of mathematics in basic education considering a broader context for the appropriation of knowledge.

What we see in this PGD is the search for building a mathematics teaching that offers opportunities for students to learn ways to work in internships and professional life. It is necessary to highlight the mobilization of theoretical references that point to a constructivist and critical perspective of mathematics teaching, according to Chart 01.

Chart 01 - Benchmarks mobilized in the subject of mathematics teaching I in the semester 2000.2.

Author	Title	Year
Ubiratan D'Ambrósio	The knowledge: its generation, its intellectual and social organization and its diffusion; Ethno mathematics	1996; 1990
Newton Duarte	Vygotsky's school and school education	1996
Gelsa Knjnik	Exclusions and resistance: mathematics education and cultural legitimacy	1996
Delia Lerner e Patricia Sodovsky	The numbering system: a didactic problem	1996
Teresinha Nunes e Peter Bryant	Math about different names; Getting started with counting; Understanding numbering system; Giving meaning to addition and subtraction; Explaining memorization; Progressing to multiplication and division.	1999; 1999; 1999; 1999; 1999; 1999.
Ana Cristina S, Langel	Cognitive and moral development, mathematical learning and economic determinants.	1992
Terezinha Nunes Carraher David William Carraher Analúcia Dias Schiemann	In life ten, at school zero: the cultural contexts of mathematical learning.	1995
Maria Cecilia de Oliveira Micotti	Teaching and pedagogical proposals	1999
Dair Aily Franco de Camargo	Classroom structure: effects on students' cognitive style and functioning	1999
Federative Republic of Brazil	National Curriculum Parameters: Mathematics	1997

Source: Adapted from PGD of FE/UERN.

The number of references was sixteen, with publications between the years 1990 and 1999, i.e. updated for the semester in progress. We highlight the discussions about the production of knowledge by the students, about the cognitive process of the child in forming numbers, as well as the need to know mathematics and approaches such as Ethno mathematics, for example, very current at that time. We can see from the references that the



teachers brought discussions about the teaching of mathematics and its relations with social issues, daily life and practices of life, besides the Parameters that guided the teaching in Brazil.

The subject Mathematics Teaching I presented aspects to understand mathematics socially and the representations that are made in our daily lives, as in simple situations such as the use of mental and written calculus in society. In the methodology and evaluation aspects, the component was based on expository teaching, debates, and scientific research for professional development, as well as the fulfillment of the proposed activities and the results achieved during the course of the component.

The subject Teaching of Mathematics II, in the same semester of 2000.2, presents in its menu: Study of the teaching of mathematics in the initial years, considering the logical, historical, cultural, and pedagogical aspects involved in the process of appropriation of school mathematical knowledge. Formation of basic concepts by students in relation to rational numbers, measurement systems, and geometry. Information technology in mathematics education.

The syllabus presents elements of continuation to the proposal of the subject Mathematics Teaching I, such as working with mathematical concepts in basic education, but with the insertion of other elements such as geometry, measures, etc. The subject foresaw an approach with tables and graphs, as well as discussions about the involvement of technological tools in the educational scenario, besides contemplating the formation of mathematics teachers in its discussions. In its objectives and programmatic content, we can verify the work with questions about the treatment of information, measures and spaces and shapes in a social perspective.

The evaluative and methodological process, as well as the subject Mathematics Teaching I, seeks to highlight the process of researching, debating, and carrying out the proposed activities, both individual and collective, through the understanding of practical analyses seen in the references as a way of looking at reality.

Regarding the references mobilized in the subject Teaching of Mathematics II, in the semester 2000.2, it is possible to notice that they are well aligned with the proposals presented previously, as it is possible to analyze in Chart 02.

Chart 02 - Benchmarks mobilized in the subject of mathematics teaching II in the semester 2000.2.

Author	Title	Year
Marcelo C. Borba	Computer technologies in mathematics education and the reorganization of thinking.	1990
Marilia Centurion	Numbers and operations: Mathematics content and methodology	1994
Beatriz D' Ambrósio	Mathematics teacher education for the 21st century: The great challenge	1993
Ubiratan D' Ambrósio	Knowledge: its generation, intellectual and social organization and dissemination	1996
Newton Duarte	Vygotsky's school and school education	1996
Gelsa Knunik	Exclusions and resistance: mathematics education and cultural	1996

DOI: 10.20396/zet.v30i00.8667891

	legitimacy	
José Nilson Machado	Measuring lengths; Polyhedral and Plato and fingers; Polygons, centipedes and other bugs	1994; 1994 e 1994
Maria Cecilia de Oliveira Micotti	Teaching and pedagogical proposals	1999
Teresinha Nunes e Peter Bryant	Measurement systems; Understanding rational numbers	1999; 1999
Miriam Godoy Penteadó	New actors, new scenarios: discussing the insertion of computers into the teaching profession	1999
Federative Republic of Brazil	National Curriculum Parameters: Mathematics	1997
Terezinha Nunes Carraher David William Carraher Analúcia Dias Schiemann	In life ten, at school zero	1995
Marilia Toledo e Mauro Toledo	The construction of mathematics	1999

Source: Adapted from PGD of FE/UERN.

It is notable in PGD the presence of references updated for that period, since we can observe that they were texts published between the years 1990 and 1999. We point out that there are four references that are repeated when compared to the PGD of Mathematics Teaching I. The references discuss understandings about mathematics, numbers in the pedagogical context, possibilities for the pedagogue's work in teaching, as well as the insertion of technology in the school environment. Finally, it is worth mentioning that both PGDs for the 2000.2 semester have professor Maria Auxiliadora da Costa as a teacher of the courses.

In the PGD of the 2005.1 semester, the course outline of Teaching Mathematics II remained the same as the one taught in the 2000.2 semester. As for the objectives and contents, the difference is the insertion of technologies in the syllabus (which appeared before in the references, but not in the contents). The main noticeable changes are in the references mobilized, as can be seen in Chart 03.

Chart 03 - Benchmarks used in the subject Teaching Mathematics II in the semester 2005.1.

Author	Title	Year
Federative Republic of Brazil	National curricular parameters for mathematics teaching	1997
Ubiratan D'Ambrósio	Values in mathematics education	1990
Dione Lucchesi Carvalho	Mathematics Teaching Methodology	1994
Délia Lerner	The Decimal Numbering System: A Teaching Problem didactic problem	1996
Maria Cecília de Oliveira	Teaching and pedagogical proposals	1999
Teresinha Nunes and Peter Bryant	Children doing mathematics	1999
Kátia Stocco Smole, Maria Ignez Diniz and Patrícia Candido	Problem solving; Reading, writing, and problem solving: basic skills for learning mathematics.	2000; 2001
César cool and Ana Teberosky	Learning Mathematics: essential contents for elementary school from 1st to 4th grade	2000

Source: Adapted from PGD of FE/UERN.

About the references used, when compared to the semester of 2000.2, which contained 16 titles, we see that there was a reduction, since in the PGD of 2005.2 there are only 09 references to be used, keeping only the *National Curriculum Parameters and the work O ensino e as propostas pedagógicas*. The theoretical bases point to discussions with possibilities in working with numbers in the early years, as well as the importance for teachers in training to understand how children learn mathematics at this stage of training. Another important element we noticed is the absence of texts dealing specifically with educational technologies and also with measures and graphs, which was visible in the subject of Mathematics Teaching II in the semester 2000.2. Moreover, an element that caught our attention was the insertion of references that deal with the reading and interpretation of mathematics.

The same happens in the following year, in the semester 2007.2, with the PGD of the subject Teaching of Mathematics II, which remains with the same structure as in the semesters 2005.1 and 2000.2. The only change is related to the mediation of the subject, which previously had only the teacher Maria Auxiliadora and, in this PGD, foresees other professionals: Francisca Maria Gomes Cabral and Maria da Conceição Nogueira Dantas.

It is worth to register that the Pedagogy course of FE/UERN, from the year 2007, has passed for great changes in the curricular matrix, some disciplines were extinct, others were created and others, still, suffered alterations. More specifically about the teaching of mathematics, the courses Mathematics Teaching I and II were extinct and a single component was created: Mathematics Teaching. It is also worth mentioning that the course load that used to be 150 class hours to approach the teaching of mathematics (75 for each component) was drastically reduced to 60 class hours, offered in the 6th period.

The component is offered at the same time as the Supervised Internship II, which takes place in the initial years, and with the Thematic Seminar II component, which has a proposal of theoretical-practical articulation between the components of the 6th period and the Supervised Internship, pointing, for example, discussions that involve teaching in a perspective of interdisciplinary and practical work.

We emphasize that the organization for curricular restructuring of the Pedagogy course of FE/UERN, "experienced since 2002 [...] came to intensify with the approval of the Curricular Guidelines for the Pedagogy course, gaining greater impulse from 2007" (Oliveira, 2016, p.4 ), and reflected the articulation of the faculty with the units that offered the Pedagogy course in the other campuses of UERN, in order to reintegrate assumptions that brought contemporary representations of the debates about the profile of the pedagogue in a conjuncture of expansion of the teaching work in the educational scenario, obeying the National Curricular Guidelines (DCN) and other legal entities that define the national education.

In this scenario of changes, it is worth mentioning that in this period there is the concomitance of the two curricula, so the Teaching of Mathematics I and II components are

DOI: 10.20396/zet.v30i00.8667891

still taught for some semesters, until all the students of the declining curricular proposal could conclude their formative processes.

In this sense, the PGD of Mathematics Teaching I, for the semester 2008.1, has the same syllabus as the syllabus of the semesters 2000.2 and 2006.1. In the objectives, the use of educational games in the teaching and learning process is added, as well as discussions about logical, historical, cultural, and pedagogical aspects, which were not contemplated in the PGD.

The contents reflect on what has been maintained in the discipline since the 2000.2 semester, inserting an approach on working with mathematical problem solving. The methodological and evaluation processes of the discipline remain the same. However, as for the references, Chart 4 shows that the course mediated by professor Francisca Maria Gomes de Cabral underwent major reorganizations, keeping only the *National Curricular Parameters*.

Chart 04 - Benchmarks used in the subject Mathematics teaching I in the semester 2008.1.

Author	Title	Year
Federative Republic of Brazil	National Curriculum Parameters: Mathematics	1997
Terezinha Nunes; Tania Maria Mendonça Campos and Sandra Magina	Mathematics Education 1: numbers and numerical operations	2005
Cecilia Parra and Irmã Saiz	Didactics of Mathematics: psycho-pedagogical reflections	1996
Analúcia Schliemann and David Carraher	Understanding arithmetic concepts: teaching and research	1998
Marília Toledo and Mauro Toledo	Didactics of mathematics: as two and two: the construction of mathematics	1997

Source: Adapted from PGD of FE/UERN.

The following year, also mediated by teacher Francisca Cabral, the PGD of the subject Mathematics Teaching I for the semester 2009.1 shows that there are basically no changes, with the exception of the subject's theoretical framework, since some new texts were inserted, as can be seen in Table 5.

Chart 05 - Benchmarks used in the subject of mathematics teaching I in the semester 2009.1.

Author	Title	Year
Ubiratan D'Ambrósio	The interface between history and mathematics: a historical-pedagogical view;	2008;
	Why ethno mathematics?	2002;
	What mathematics should be learned in schools today?	2002;
	Pro-mathematics and its implications in the national curricular parameters	2001
Federative Republic of Brazil	National Curricular Parameters: mathematics	1997
Kátia Stocco Smole, Maria Ignez Diniz; Kátia Stocco Smole, Maria Ignez Diniz and Patrícia Candido	Reading, writing and problem solving: basic skills for learning mathematics; Problem solving	2001; 2000
Delia Lerner and Patricia Sodovsky	The numbering system: a didactic problem.	1996
Teresinha Nunes, Tania Maria Mendonça de	Mathematics education: numbers and numerical	2005

Campos and Sandra Magina	operations	
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Source: Adapted from PGD of FE/UERN.

It is essentially important to make evident the maintenance of *the National Curricular Parameters* in all the analyzed PGDs, because it was the document that guided the teaching of mathematics in Brazil. Besides it, the work *Educação Matemática: números e operações numéricas* (Mathematics education: numbers and numerical operations) is kept in this PGD, the other referenced works are all different from the previous year. We should point out that Ubiratan D'Ambrósio's references, particularly in the PGD of 2009.1, had their reading deepened in different themes, such as Ethno mathematics, for instance, resuming a discussion that had appeared in the semester 2000.2. It is also worth mentioning that the works that were present in the PGD of Mathematics Teaching II in the semester 2005.1 are resumed.

In semester 2011.1, the course was offered in the new curricular matrix: Mathematics Teaching. Its General Curriculum of the Curricular Component (PGCC) presents Marithiça Flaviana Florestino da Silva as the teacher responsible for the subject. The menu of this component includes Objectives and purposes of Mathematics in school curricula. Research, practice and theorization about objectives, themes, contents, concepts and methodologies approached in teaching. Production and use of didactic materials and technological resources in teaching Mathematics. In terms of objectives, the PGCC points to the understanding of mathematics as a language and system of representation, the importance of mathematics in school curriculums, the methodological alternatives of working with mathematics using games and technological resources.

The contents are about numbers and operations, information processing, magnitudes and measures, space and shape, among others that require a theoretical and practical understanding of mathematics to be worked on in the early years of elementary school. In the methodological processes, we can highlight some changes when compared to the previous PGD's, pointing to a work of understanding the problematization of mathematics inside and outside the classroom, fiches, reflections on the practice, planning, production of didactic material, and workshops. The evaluation process has also been transformed: the production of murals, newspapers, problem libraries, and blogs are mentioned in the PGCC, which was not foreseen in previous years.

As for the benchmarks set forth in the PGCCP of Mathematics Teaching for the 2011.1 semester, we can analyze Chart 6.

Chart 06 - Benchmarks mobilized in the subject of mathematics teaching in the semester 2011.1.

Author	Title	Year
Pedro Ribeiro Barbosa	The teaching material: Rectangular Parts	2010
Federative Republic of Brazil	National Curriculum Parameters: Mathematics National Curriculum Standards for Early Childhood Education	1997; 1998
Maria da Conceição Fonseca	Geometry teaching in elementary school: three issues for the formation of early grade teachers	2002
Delia Lerner; Patricia Sadosky	Decimal Numbering System: a didactic problem didactic problem	1996

DOI: 10.20396/zet.v30i00.8667891

José Nilson Machado	Measuring lengths	2009
Teresinha Nunes; Tania Maria Campos; Sandra Magina and Peter Bryant	Mathematics education: numbers and numerical operations	2005
Vera Maria Masagão Ribeiro	Youth and Adult Education: Elementary Elementary School: Curriculum Proposal - 1st segment	2001
Kátia Stocco Smole; Maria Ignez Diniz and Patrícia Candido	Figures and Shapes Problem Solving	2003; 2003

Source: Adapted from PGD of FE/UERN.

The subject again received updates of basic texts for discussion, some texts of authors such as Decimal Numbering System: a didactic problem, Mathematics Education: numbers and numerical operations and the National Curricular Parameters remain, the others are added. It is worth mentioning the appearance of the National Curricular Referential for Children Education, inserting the discussions of mathematical contents in children education, something not approached until then. We also highlight the recent years of publication of the references, if we take the year the component is offered.

In the semester 2014.1, the PGCC of the subject Teaching of Mathematics had as responsible teachers two names Maria da Conceição Nogueira Dantas and Francisco Evânio Dantas Raposo. The subject did not change for this semester, when compared to the semester 2011.1, except for the theoretical references studied, as shown in Chart 07.

Chart 07 - Benchmarks mobilized in the subject of mathematics teaching in semester 2014.1.

Author	Title	Year
Maria Aparecida Viggiani Bicudo	Mathematics Education	2005
Federative Republic of Brazil	National Curriculum Parameters: Mathematics National Curriculum Standards for Early Childhood Education	1997; 1998
Constance Kamii	The child and the number: educational implications of Piaget's theory to work with 4 to 6 year old students	1991
Teresinha Nunes; Tania Maria Campos; Sandra Magina and Peter	Mathematics education: numbers and numerical operations	2009
Teresinha Nunes and Peter Bryant	Children doing Mathematics	1999

Source: Adapted from PGD of FE/UERN.

We point out that the changes made in the PGCC of the subject of Mathematics Teaching for the semester 2014.1 show a decrease in the references used in the development of the subject, compared to the semester 2011.1 that contained 11 references, falling to 06, of which we point out the maintenance only of the curriculum documents and Mathematics Education: numbers and numerical operations. The references of Constance Kamii and Maria Bicudo appear as novelties not previously mentioned.

The PGCC of the subject of Mathematics Teaching for the semester 2021.1 presents many changes when compared to 2014.1. We take into account the passing of the years, in addition to changes in teaching guidelines, as we can see with the changes from the PCNs to the BNCC, but, even so, the parameters continue to be discussed in the subject. The subject Mathematics Teaching is mediated in the semester of 2021.1 by professors Marcelo Bezerra de Moraes and Alex Carlos Gadelha.



DOI: 10.20396/zet.v30i00.8667891

We want to make evident the changes that have occurred in the current PGCC of the subject, which is presented as: Philosophical understandings about mathematics. Historical aspects and goals of school mathematics. Mathematics teaching and curriculum. The subject and the production of mathematical knowledge. The contents, teaching resources, and methodological trends for teaching mathematics. Research, practice and theorizing in Mathematics Education in basic education.

It is essentially important to understand that philosophical and historical conceptions emerge as new elements in the course of the subject, intertwined with the conception of knowing and discussing the processes of teaching and learning mathematics in the context of basic education. The methodological work can cooperate so that teachers help their students to produce meaning in life through theorizing and methodologies that dialogue with mathematics education, which is a new discussion in the PGCCPs, since Mathematics Education, as a field of knowledge, appears only in this course syllabus.

Another important change appears in the objectives of the PGCCP of the subject Teaching of Mathematics, when compared to the previous one we had access to in the semester 2014.1. This new PGCCP proposes the number of five objectives in total, which discuss about the understanding of the concepts of mathematics teaching in social practices that we perform in everyday life, the understanding of the history of mathematics education, the concept of mathematics anxiety, the national guidelines for teaching mathematics in Brazil and building didactic-pedagogical resources to be used in the school context.

The contents continue to be worked in three units, but some changes are noted, such as the introduction of studies on Mathematics Education, the concept of math anxiety and how to treat it, the development of logical thinking, and the work with mathematics in early childhood education. Later, discussions are promoted about numbers, algebra, geometry, quantities and measures, probability and statistics, following the thematic units proposed in the BNCC. In the last unit of the subject, ways to contribute to the mediation of mathematical content in basic education and the production of didactic/pedagogical resources are addressed.

We make it evident that in the semester 2021.1 the activities were developed remotely, as a consequence of the Covid-19 pandemic, due to recommendations from health agencies, avoiding crowds in the face-to-face context experienced in the institution. As a result, the methodology and evaluation of the course are adapted to the situation of synchronous and asynchronous classes, with classes being held in Meet, Google Classroom, cell phone applications, videos, seminars, Padlet, Jamboard, blogs, among others, demonstrating the work with educational technologies and software to cooperate with the mediation of content during the remote classes.

As for the mobilized theoretical references, we emphasize that they are divided into basic and complementary, in great number, which are presented in Chart 08.

Chart 08 - Basic references mobilized in the subject Teaching Mathematics in the current semester of 2021.1.

Author	Title	Year
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DOI: 10.20396/zet.v30i00.8667891

<b>Basic Benchmarks</b>		
Federative Republic of Brazil	National Curriculum Parameters: mathematics; National Curriculum Standards for early childhood education; Common National Curricular Base	1997; 1998; 2016
Rute Borba e Gilda Guimarães	Research and activities for mathematical learning in early childhood education and the early years of elementary school	2015
Sônia Maria Clareto	Teacher, who invented mathematics? Crossings of a question that becomes a problem and a problem that invents curriculum	2016
Beatriz S. D'Ambrósio	The responsible subversion in the constitution of the mathematics educator	2015
Ubiratan D'Ambrósio	Mathematics Education: from theory to practice	2012
Anderson Oramisio Santos Adriana Mariano Rodrigues Junqueira Guilherme Saramago de Oliveira	Theories of learning and mathematical knowledge: theoretical contributions to teaching practice	2015
Ole Skovsmose	An Invitation to Critical Mathematics Education	2014
<b>Complementary Benchmarks</b>		
Sônia Maria Clareto; Margareth A. Sacramento Rotondo	What Would a World Without Mathematics Look Like? Huh?! In narrative-truth tension	2014
Françoise Cerquetti-Aberkane Catherine Berdonneau	Teaching mathematics in early childhood education	1997
Terezinha Nunes Carraher; David William Carraher; Analúcia Dias Schiemann	In life ten, at school zero	2001
Ubiratan D Ambrósio	Ethno mathematics	2007
Newton Duarte	Teaching Mathematics in Adult Education	2009
Maria da Conceição F. R. Fonseca, Maria da Penha Lopes, Maria das Graças Gomes Barbosa, Maria Laura Magalhães Gomes, Mônica Maria Machado S. S. Dayrell	Geometry teaching in elementary school: three issues for the formation of early grade teachers	2002
Maria Laura Magalhães Gomes	History of Mathematics Education: an introduction	2013
Constance Kamii	Children and numbers: educational implications of Piaget's theory for the work with 04 to 06 year old children	2008
Vanessa Dias Moretti	Mathematics education in the early years of elementary school: pedagogical principles and practices	2015
Adair Mendes Nacarato Iris Aparecida Custodio	The Development of algebraic thinking in basic education: sharing classroom proposals with the teacher who teaches (will teach) mathematics	2018
Teresinha Nunes; Tania Maria Campos; Sandra Magina; Peter Bryat	Mathematics Education 1: numbers and numerical operations	2005
Cecilia Parra; Irma Saiz	Didactics of Mathematics: psycho-pedagogical reflections	2001

Source: Adapted from PGCC of FE/UERN.

Among the references mobilized as basic, we can see that the instruments that guide the teaching in Brazil are maintained, the PCN and RCNEI, with the insertion of the Common National Curricular Base in the discussions held. The others are new authors, with productions that discuss the teaching of mathematics in early childhood education and elementary school, critical mathematics education, teacher training, are elements understood as constituents in the discussions of the subject.

The references used as complements, 13 in total, are texts that have already been used by other teachers in Mathematics Teaching courses in previous years, such as the texts by Nunes, Carraher and Schiemann; D'Ambrósio; Duarte; Kamii; as well as the presence of new references, such as Moretti, Nacarato and Custodio.

From the analysis of all these documents, it is possible to indicate that the components Mathematics Teaching I and II and Mathematics Teaching had mainly maintenance, suffering changes mainly in the references, which, apparently, the teachers sought to update following more recent discussions and in order to meet the contents programmed for the disciplines.

### **Some possible notes**

As pointed out initially, this article aimed to analyze historically the process of teacher education to act in the teaching of mathematics in the initial years offered by the degree course in Pedagogy of FE/UERN, from its creation in 1966. Due to the absence of historical records with which we could analyze the first years of operation of this course, our analyses were based on the curricular matrix that was in force at least from 1982 on (about what we suppose it was the same in force before).

From resolutions constituted along the years, we point to three historical moments that divide the formative course of the Pedagogy course of FE/UERN to evaluate a formation focused on mathematics teaching, being these marks: 1967, with the beginning of its functioning; 1995 with the first curricular reformulation and 2007 with the second curricular reformulation of the course.

In this sense, it is possible to notice in the first curricular matrix, established and in operation between 1982 and 1994, that there was a concern in offering educators a training that aimed at recovering/overcoming possible difficulties in learning the mathematics contents of basic education, with the offer of the subject Elements of Mathematics. About this curriculum, it was not possible (due to the absence of documents) to assess if there was a specific subject to work on didactic aspects of the teaching of mathematics, but we raise the hypothesis that there was at least one specific didactic subject for the qualification in Teaching of Subjects and Practical Activities of the Normal Courses (EDA-PE), which trained the pedagogue to work in teacher-training courses at the high school level.

After a reformulation of the curriculum in 1995, which established a new educational matrix that lasted from 1995 to 2006, two specific didactic subjects were created, Teaching

DOI: 10.20396/zet.v30i00.8667891

Mathematics I and II, and the subject Elements of Mathematics, previously mentioned, ceased to exist. Thus, in this context, it is possible to notice a greater concern regarding the didactic aspects, considering that the subjects approached teaching strategies for elementary school contents and not, necessarily, the mathematical contents themselves.

A new matrix was created in 2007, in effect until today, when the previous disciplines were extinguished and a single curricular component called Teaching of Mathematics was established. We emphasize, in this alteration, a strong decrease in the number of hours devoted to the formation for the teaching of mathematics in the Pedagogy course of FE/UERN, which totaled 150 class hours in the previous matrix and was reduced to only 60 class hours.

As for the work developed in this discipline, it is possible to point out that, among the curricular reformulations, apparently the disciplines are, to a great extent, kept with the same formative profile. The main changes are marked, notably, in the bibliographic references used, which vary, not only according to the teachers who teach the component, but, sometimes, from one year to another with the same teacher.

In general, at least since the year 2000, the Pedagogy course of FE/UERN has mobilized references and approaches strongly based on theoreticians of the Mathematics Education field, promoting not only discussions that can be considered current, but also mobilizing references that are, to a great extent, always updated in each period. Still, it is worth noting that these approaches strongly dialog with a perspective of mathematics teaching based on social, critical and constructivist issues.

Thus, we understand that the training for the teaching of mathematics to educators in this institution seeks, at least in the last two decades, to articulate discussions present in the social life of those involved, always paying attention to the orientations present in teaching regulation documents and recent scientific studies. It is necessary to register that other studies are necessary not only to understand some historical processes with the absence of documents pointed out here, but also to analyze how these official records were effectively mobilized by the subjects that made use of them.

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