

# Periodisation as an Approach in Historiographic Research in Mathematics Teaching: Reflections on Two Case Studies

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## ABSTRACT

**Background:** The study of the history of mathematics teaching can be approached from different perspectives, defining contours from which the researcher performs the analysis focused on a process characterised by continuity, or by adopting periodisation. **Objective:** In this article, we seek to conduct a study based on the delimitation of periods, according to Le Goff's (2014) argument, and in the light of the depth hermeneutics, based on Thompson (2011). **Design:** Given the premises above, we conducted a documentary analysis of two historical processes within the scope of mathematics teaching, one focusing on the municipal public schools of Canoas, and the other on a technical course in chemistry of a school in the city of Novo Hamburgo, both in the state of Rio Grande do Sul. **Setting and participants:** A timeline with conspicuous events used to periodicise both historical processes analysed by the authors. **Data collection and analysis:** Analysis of documents relevant to the history of the technical school investigated and education in the municipality of Canoas. **Results:** In both cases, it was possible to characterise the historical processes in periods based on events and official documents that generate changes in mathematics teaching. **Conclusions:** The historical processes analysed are characterised by ruptures resulting from changes, especially in the legislation, both in the municipal public network and in the technical education institution researched, enabling the realisation of changes and the characterisation of distinct periods, with their nuances.

**Keywords:** Periodisation; Mathematics teaching; History of mathematics teaching.

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## A Periodização como Abordagem em Pesquisas Historiográficas em Ensino de Matemática: Reflexões Acerca de Dois Estudos de Caso

### RESUMO

**Contexto:** O estudo da história do Ensino da Matemática pode ser abordado com diferentes perspectivas, delineando contornos a partir dos quais o pesquisador realiza a sua análise focado em um processo caracterizado pela continuidade, ou pela adoção da periodização. **Objetivo:** No presente artigo, busca-se realizar uma análise com base na delimitação de períodos, conforme a argumentação de Le Goff (2014), e sob a luz da Hermenêutica de Profundidade embasada em Thompson (2011). **Design:** Diante das premissas supracitadas, foram realizadas as análises documentais de dois processos históricos no âmbito do Ensino da Matemática, um focando nas escolas públicas municipais de Canoas/RS, e outro no Curso Técnico em Química de uma escola da cidade de Novo Hamburgo, ambas no estado do Rio Grande do Sul. **Cenário e participantes:** Uma linha temporal com eventos conspícuos utilizados para a periodização de ambos processos históricos analisados pelos autores. **Coleta e análise de dados:** Análise de documentos relevantes para a história da escola técnica investigada e da educação no município de Canoas. **Resultados:** Em ambos os casos foi possível caracterizar os processos históricos em períodos com base em eventos e documentos oficiais geradores de mudanças no Ensino de Matemática. **Conclusões:** Os processos históricos analisados são caracterizados por rupturas decorrentes de alterações, sobretudo, na legislação, tanto na rede pública municipal, como na instituição de ensino técnico pesquisada, permitindo o reconhecimento das mudanças e caracterização de períodos distintos e com nuances próprias.

**Palavras-chave:** Periodização; Ensino de Matemática; História do Ensino da Matemática.

### INTRODUCTION

One of the reasons why it is quite difficult to study contemporary history is that we do not know what will happen later. It is necessary to say this clearly. (Le Goff, in an interview with Augras, 1991, p. 263)<sup>1</sup>

Over the centuries, humanity, among the many problems it has tried to solve, has redoubled its efforts to control time. If, on the one hand, it was

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<sup>1</sup>The Interview was conducted in 1992, however, it was published in a 1991 edition of the journal *Estudos Históricos*.

possible to organise daily life through calendars, on the other hand, it was hard to understand more extended periods. And, faced with the impossibility and unpredictability of the future, human beings were then concerned with mastering their past.

However, for this mastery to occur effectively, a form of organisation of the past must first be thought. Over time, the most diverse terms were used to structure it, such as ages, times, cycles, and periods. The latter, in the eighteenth century, meant “time interval,” took, in the twentieth century, its derived form, called “periodisation,” a process that serves to indicate human action over time, in an excerpt characterised by a value judgment regarding historical processes (Le Goff, 2014).

It is important to emphasise that the analysis through periodisation does not invalidate the continuous look that observes, with different lenses, a history characterised by the continuity of the elements in question. More broadly, the historical analysis can be performed by combining continuous processes, however, marked by points of inflexion, whose relevance provide the subdivision into periods and thus more easily understand the phenomena occurred. However, this article focuses precisely on the observance of conspicuous changes generated mainly by documents that are part of educational legislation. Assisted by Thompson’s depth hermeneutics, this work aims to analyse two historical processes in the field of mathematics teaching from the perspective of periodisation and justify the temporal boundaries attributed to the educational processes of a municipality and a technical school.

## **PERIODISATION AS A METHODOLOGY OF ANALYSIS**

Periodisation as a methodology of analysis is relatively new in history<sup>2</sup>. Strictly speaking, long before it reached its current status in historical research, it was already used as a method to organise the past. The known structure comes from religious people, who used those criteria or biblical characters to divide time. In his work *A história pode ser dividida em pedaços?* (Can history be

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<sup>2</sup>Inspired by the wave of globalisation of history, in 2009, the collective work called “*Histoire du monde au XV siècle*” (The History of the World in the 15th Century) was launched, organised by Patrick Boucheron, in which histories are compared in different (western) countries in the 15th century without, however, integrating them into periodisation.

divided into pieces?), French historian Jacques Le Goff addresses in depth the issue of periodisation.

In other words, two models are considered essential in the advent of periodisation. The first model, proposed in the Old Testament by prophet Daniel, refers to number four (inspired by the four seasons of the year), which would be the equivalent of the number of successive kingdoms that, in the end, would constitute the “time of the world.” In this model, kings are represented by animals that intermingle successively. To better characterise the passage from one kingdom to another, Daniel indicated that one’s rise is marked by the decline of its precedent (Le Goff, 2014).

Over the centuries, the periodisation proposed by Daniel was resumed by theologians, and other interpretations of his model emerged, such as that proposed by Sleidan,<sup>3</sup> who proposed the division of time into four sovereign empires: Babylon, Persia, Greece, and Rome.

The other model used in the periodisation of time, also of a religious nature, was proposed by Saint Augustine. In this system, divided into six periods, the biblical characters appear, giving shape and meaning to the pattern suggested. The first period goes from “Adam to Noah, the second, from Noah to Abraham, the third, from Abraham to David, the fourth, from David to the captivity of Babylon, the fifth, from the captivity of Babylon to the birth of Christ; and the sixth, that must last until the end of times” (Le Goff, 2014, p. 17).

Saint Augustine’s periodisation proposal can also be analysed through two other cycles of nature, namely the six days of Creation, or the six ages of life, thus cited by Le Goff (2014, p. 18): “[...] small childhood (*infantia*), childhood (*pueritia*), adolescence (*adolescentia*), youth (*juventus*), maturity (*gravitas*), and old age (*senectus*).”

It is also important to note, within the most extraordinary efforts aimed at controlling time, the proposal, in the sixth century of the Christian era, of the division between before and after the birth of Jesus Christ. This proposal, in turn, served for the whole West to assume this identity, and the time of

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3Jean Sleidan (1506 - 1556), *Trois Livres des quatre empires souverains, à savoir de Baylone, de Persa, de Grèce et de Rome* (Three books of the four sovereign empires, Babylon, Persia, Greece, and Rome).

humanity began to be described as “BC” or “AD,” before Christ and after Christ, respectively.

For Le Goff, some phenomena mark periods and whose configurations distinguish them from the others in the face of changes worthy of note in history. Le Goff states that:

[...] Western societies suffered decisive shocks during the nineteenth century. [...] in the first place, the technological shock, the discoveries, of course, the industrial revolution; and also the social and political shock arising largely from the French Revolution, which, I believe, marked the end of one world and the beginning of another. Although great thinkers, such as Tocqueville, also see the continuities of the Old Regime in the Revolution, the modification seems fundamental to me (Le Goff, in an interview to Augras, 1991, p. 265).

Addressing elements of continuity that would characterise the period between the third and nineteenth centuries, Le Goff states that, even so

[...] there have been changes important enough to consider subperiods in this time interval, since there is the “Late Antiquity, then the Middle Ages itself, Renaissance, Modern Times, which is actually a period with new characteristics. But I believe that, fundamentally, the deep structures remain until the beginning of the nineteenth century (Le Goff, in an interview to Augras, 1991, p. 266).

Other forms of periodisation were outlined during the centuries and accepted without major disputes until the eighteenth century, when a new way of considering time emerged, based on a look that would have occurred more precisely in the fourteenth century (Le Goff, 2014). Besides being human beings’ work, periodisation can become provisional because, in Le Goff’s words (2014, p. 29), “It evolves with history itself.” And, at the same time as it is an important tool for controlling past time, it is unstable within history itself.

Regarding the argument and the constitution of the periodisation, the author states that:

[...] it is never a neutral or innocent act [...]. Through periodisation, an appreciation of the sequences thus defined is expressed, a judgment of value, even if it is collective. In fact,

the image of a historical period can change over time. (Le Goff 2014, p. 29)

It is also necessary to reflect on the approximations and distances of periodisation in relation to calendars, which, just like it, organise time. However, what separates and differentiates them is the issue of scope: periodisation is always centred on long passages, and it also must necessarily relate to concreteness.

The periodisation as a methodology and way of thinking the historiographical research based on sources is defined by Le Goff (2014, p.132) as “the objective bases” on which the social sciences, especially history, are based. Time, in turn, is not static and, as Le Goff (2014, p. 132) states, “Time is part of history - the historian needs to dominate it, while it is in his/her power, and as this time changes, periodisation becomes, for the historian, an indispensable tool.” The author goes on to affirm that it is possible to combine the association of long duration (continuity) with periodisation (discontinuity) in the analysis of historical processes.

## **PERIODISATION IN THE HISTORICAL PROCESSES OF THE MUNICIPALITY OF CANOAS AND A TECHNICAL SCHOOL**

Defended in 2018, the master’s research of two of the authors of this article addressed the issue of the history of mathematics teaching. One of the studies focused on the municipal schools of Canoas, the other, a technical school in the city of Novo Hamburgo, both in the state of Rio Grande do Sul.

The first dissertation, entitled *A História do Ensino de Matemática nas Escolas Públicas Municipais de Canoas de 1940 a 2016* (The History of Mathematics Teaching in Municipal Public Schools of Canoas from 1940 to 2016), has the foundation of the municipality as the opening period. It analyses schools mathematics curricula in that society’s cultural environment, from the global, national, state, and municipal levels, given the influence of these aspects in the community and its school. In this perspective, Le Goff (2014, p. 17) argues that:

[..] the customs that characterise the population of a region directly influence the teaching method. School culture is directly linked to the culture of the community. When

analysing the educational context of a municipality, one should look at the surroundings where this education is inserted, what we have of culture around the walls of the school. Thus, school education is a reflection of its people's culture.

The researcher's primary insertion in the historical aspects and the process of knowledge of the community context represent essential foundations in approaches of this nature, such as in an investigative process in the mathematics education field. Thompson (2011, p. 358) notes that:

The socio-historical world is not only a field-object that is there to be observed; it is also a *field-subject* that is built, in part, by subjects who, in the routine course of their daily lives, are constantly concerned with understanding themselves and others, and interpreting the actions, speeches, and events that occur around them.

Thus, the research chose a time frame that enabled the analysis from the similarities and differences between the different periods. The division into chapters, highlighting the decades and the main changes in legislation in the educational field favoured the identification of the main points modified in the mathematics contents of the municipal public schools of Canoas throughout the established historical clipping.

The researcher's immersion in the analysis of the documents, acknowledging the context robustly and broadly, facilitates the understanding and interpretation of signs and elements that are forged through that writing. Being part of history is a precious act for the researcher to become a historian. Therefore, there is a need to encompass knowledge by contextualising the socio-historical process as a whole. Corroborating this, Thompson (2011, p. 360, author's emphasis) presents us that:

There is another related aspect, due to which hermeneutics retains its importance today, it reminds us that the *subjects that constitute part of the social world are always inserted in historical traditions*. Human beings are *part of* history, not just its observers or spectators; historical traditions, and the complex range of meaning and values that are passed from generation to generation are partly constitutive of what human beings are. (Thompson, 2011, p. 360)

The research developed in the dissertation encompasses the pedagogical trends presented by Fiorentini (1995) and their possible influences on the formation of mathematics curricula throughout the period analysed, articulated with the legislation, especially the Laws of Guidelines and Bases of National Education - LDB in its three versions (1961, 1971, and 1996), as well as the influences of mathematics teachers of the Ministry of Education (MEC), who were among the greatest defenders of the pedagogical currents described by Fiorentini (1995).

The concept of teaching quality, in fact, is relative and changes historically suffering socio-cultural and political determinations. In more specific terms, it varies according to the epistemological, axiological-theological and didactic-methodological conceptions of those who try to produce the innovations or transformations of teaching. (Fiorentini, 1995, p. 2)

Among the time frames highlighted in this research, the first concerns the 1940s and 1950s. This grouping of approximately twenty consecutive years concerns the scarce documents found in the archives of the municipal schools and the Municipality of Canoas. Another relevant factor that highlights the importance of this time frame was the municipality emancipation in 1939 and the inauguration of the municipal public education network in 1940, with the opening of the first schools.

At the same time, at the national level, during Getúlio Vargas's government period, discussions on the primary education regulation started through a federal law. However, due to the Vargas's destitution, only on January 2, 1946, did President José Linhares sanction Decree-Law 8.529, called Organic Law of Primary Education, which regulated the educational bases of this level of Brazilian school education.

The Organic Law of Primary Education established that:

Art. 12. Primary education will comply with minimum programmes and essential guidelines, based on objective studies, which carry out the technical bodies of the Ministry of Education and Health, with the cooperation of the States.



*Sole paragraph.* The adoption of minimum programmes shall not hamper regional adaptation programmes, provided that the general principles of this decree-law are respected.

Art. 13. It is lawful to the establishments the religious education. However, this teaching may not be the object of the teachers' obligation nor of students' mandatory attendance (Brasil, 1946).

This device was elaborated because the federal government, through studies and discussions with teachers, concluded that there was a need for minimum teaching programmes, since Brazil, a country of great territorial extension, had quite different curriculum references in its several regions. During this period, the curricula were found to have been elaborated under the influence of the classical-formalist trend, due to the centralised elaboration of the programmes in the Municipal Department of Education, and its too rigid assessment.

The second time frame used was provided by another federal law created to regulate teaching. The central government conducted studies to build a text that was able to unify the guidelines of education into a single document. Thus, in 1961, Law No. 4.024 of December 20 was enacted, establishing the first Law of Guidelines and Bases of National Education - LDBEN. From this perspective, curricula of the 1960s and 1970s were studied, which led to reformulations during the military regime, with the development of the Law of Guidelines and Bases sanctioned in 1971.

The 1970s begins with an educational reform titled the new Law of Guidelines and Bases - LDB. This reform reshapes primary education (five years) and middle school (four years), merging those two school periods and forming the first degree education (eight years). The municipal schools of Canoas, which until the 1960s enrolled students from the primary period, continued to serve students who started school life from preschool to the fourth grade of the first degree. With the implementation of the First Degree system, from first to fourth grades students are taught by one teacher (one-science), and from fifth to eighth grades, students have teachers by area of knowledge (one teacher per discipline). (Huff, 2018, p. 82)

Law No. 5.692, of August 11, 1971, established First and Second Degree Education. The major change for the municipality of Canoas was the expansion of schools that were prepared to receive primary education students, which, from then on, became part of the first degree education.

There was a demand for teachers of a specific area to serve the final grades of the first degree, and the municipality was responsible for hiring mathematics teachers to teach classes for the classes from fifth to eighth grades. However, this never occurred. Thus, the municipal public schools of Canoas became Municipal Schools of Incomplete First Degree, because they served only until the fourth grade.

A striking fact for Brazilian education was the regulation, through the 1971 LDB, of the segmentation of hours, with a minimum workload of 720 hours/class per year, corresponding to 180 school days for the eight years of the first degree. It is possible to perceive the strong technicist trend influence on the school curricula planning, with a focus on the preparing students for functional calculations by memorising and repeating, with reduced emphasis on the problematisation in mathematics education.

The third time frame of the curricular analysis was another critical political moment in Brazilian history, the political democratisation. Hence, this time frame covered from the 1980s to the 1990s. The promulgation of the new Brazilian Constitution in 1988 brought guarantees to school-age children through the passing of the Statute of the Child and Adolescent - ECA. Although today there is a disconnection between the governments and the military period, mathematics education remained very similar to the curricula of that period. Under the strong influence of the modern formalist and technicist trends, mathematics contents were mostly expressed by repetition and memorisation activities, with the 1971 LDB still in force. It is also noteworthy that:

From the new Constitution, there was a change in the designation of public resources, and the federal government decreased investments in education. However, the municipalities obtained the right to receive more financial resources. This enables municipal administration to invest more in their schools, increasing expectations in municipal public education from the 1990s. The Brazilian press launched the expectation that, in this way, it was possible to combat

illiteracy, still present in the neediest population. (Huff, 2018, p. 100)

In the mid-1990s, a new era of Brazilian education began. Then, the constructivist trend began to influence teacher planning, and students began to play a role in educational practices (Fiorentini, 1995). Even with the 1946 Organic Law of Primary Education, which provided the minimum content for the whole national territory, guaranteeing a uniform education in the 1971 LDB, its fulfilment was not possible, so...

[...] with the democratisation of the national political system, the Ministry of Education and Culture saw the need to remodel the national education system, creating the Federal Board of Education, which had the idea of redefining this system through the creation of a minimum content to be implemented throughout the national territory (Huff, 2018, p. 106).

So, they started studies to launch the National Curricular Parameters - PCN, which was approved in 1997. Addressing content that was suggestive and not mandatory, the PCNs did not present a minimum content. More precisely it was characterised, by a set of assumptions underlying teaching.

The period is also characterised by major debates and the preparation of the new Law of Guidelines and Bases - LDB, Law 9.394 of December 20, 1996. The new LDB modified basic education as follows: early childhood education (preschool), elementary school (first degree), and high school (second degree), being mandatory for all Brazilians from the age of six, and available free of charge to all who did not have an education. Also, the LDB had a minimum period of 200 school days with 4 hours per day, which could be longer periods, thus extending the duration of the school year, which until then was 180 mandatory days.

It is important to note that, with the municipalisation of the elementary school (formerly first degree education), the city of Canoas needed to expand its schools to serve the students and *comply* with the LDB of 1996. As for other several Brazilian municipalities, the federal government proposed and managed to approve the Fund for the Maintenance and Development of Elementary School - FUNDEF.

Thus, the financial contribution to the municipalities enabled an improvement in the physical structures of schools, and the city of Canoas

started a project to expand the municipal network to serve elementary school students from first to eighth grades, today from first to ninth grades (Huff, 2018).

Significant changes in school legislation happened then, being of high importance for the educational development of Brazil. Likewise, through investments - although below what it should be -, the construction of new schools in all parts of the city transformed the school reality in Canoas.

The fourth and final period, from 2000 to 2016, concerns the complementation of elementary school through Law 11.274 of February 6, 2006. The law provided: “Art. 32. Mandatory elementary school, lasting nine (9) years, free of charge in public school, starting at six (6) years of age, will aim at the citizen’s basic education,” to be in force until the beginning of the school year 2010 (Brasil, 2006).

From this complementary law, elementary school underwent a curricular restructuring. However, the first grade of the nine-year elementary school period revealed to have the same characteristics as the kindergarten. From this perspective, as the curriculum matrix change was carried out within each educational institution, considering the different interpretations, the teaching of mathematics content was reduced, at first, to classification and seriation, digits, numbers, and numerals (Huff, 2018).

The addition of the ninth year, however, modified only the initial years, as the students of the first cycle, by beginning schooling a year earlier (at the age of six), gained more time to develop literacy and literacy skills.

Therefore, by analysing the historical process in that city, the study could characterise distinct periods and their generating events, especially changes in educational legislation and its consequences.

The second research, *Um Estudo a partir da Disciplina de Matemática no currículo de um Curso Técnico Em Novo Hamburgo/RS: relações de contexto histórico no Currículo Escolar* (A Study from the Discipline of Mathematics in the curriculum of a Technical Course in Novo Hamburgo/RS: relations of the historical context in the School Curriculum), subsidised by studies on the history of the disciplines and school institutions, aimed to understand the purposes of mathematics teaching. The investigation examined the historical process of mathematics teaching in the technical course in chemistry at *Escola Liberato Salzano* between 1967 and 1995.

At the same time, the history of Brazil and Rio Grande do Sul are intertwined in the study, as social and economic changes at the national level were determinant in the transformations of the curriculum matrices and the objectives of the technical education during the period investigated. In this investigation, the period was delineated by the beginning of the activities of the educational establishment in question. However, to contextualise it, an analysis of elements was needed before the school activities started, to reveal which factors contributed to its appearance as a school institution.

The choice of the technical course in chemistry was because it was the first technical course of the *Escola Liberato Salzano Vieira da Cunha* authorised to operate and because it has remained in operation to date. Although the analysis excerpt goes up to 1995, it is noteworthy a study that approached a course that continues to this day. In this way, the efforts employed in the analyses can be resumed by future research that focuses on the periodisation process or historical studies of a distinct nature from the one used in this study.

It turns out that, because of its absolute wealth of sources, historiographical research sometimes becomes complex and, therefore, it is necessary to carefully select the documents used for the development of a logical argument that enables the interconnection of the different constituent elements of the analysis. At this point, the focus of depth hermeneutics brings significant options when one wishes to interpret the facts of the past in the face of the time frame chosen.

The perspective of depth hermeneutics represents a methodological framework that brings a series of arguments related to the analysis of symbolic forms that, according to Thompson (2011, p. 358), are significant constructions that require interpretations. They may be presented in the form of actions, speeches, or texts that, precisely because they are significant constructions, can also be understood.

Thompson (2011) notes that depth hermeneutics:

[...] highlights that the object of analysis is a significant symbolic construction and requires an interpretation. Therefore, we must give a central role to the interpretation process [...]. But symbolic forms are also embedded in social and historical contexts of different types; and being significant symbolic constructions, they are structured internally in various ways. (Thompson, 2011, p. 355)

Thompson's (2011) notion of the sciences leads to the conception that, whether social or natural, all of them, at some point, require the understanding and/or interpretation of something. This certainty, however, cannot be closed in itself, since, in this research, the horizon and the object are "pre-interpreted territories<sup>4</sup>." According to the author, the socio-historical world he seeks to investigate:

[...] is not only a field-object that is there to be observed; it is also a *field-subject* that is built, in part, by subjects who, in the routine course of their daily lives, are constantly concerned with understanding themselves and others, and interpreting the actions, speeches, and events that occur around them. (Thompson 2011, p. 358)

As the main objective is to advance in relation to the method, Thompson (2011, p. 362) warns against a fact that cannot be ignored. For him, this interpretative process: "[...] can be, and in fact requires, that it be mediated by a range of explanatory or objectifying methods." The author continues, pointing out that:

[...] "explanation" and "interpretation" should not be seen, as they often are, as mutually exclusive terms [...]; instead, they can be treated as complementary moments within a comprehensive interpretative theory, as mutually supportive steps [...]." (Thompson, 2011, p. 362)

From the viewpoint of depth hermeneutics, it is essential to understand that the object of investigation is a pre-interpreted field and, therefore, one must consider how the symbolic forms were deciphered by the subjects who thus constitute the field-subject-object<sup>5</sup>. Thus, it is necessary, at this moment, to engage in the understanding and apprehension of how the symbolic forms under study were interpreted by those who produced or received them in the course of their daily lives. Thompson (2011, p. 363) treats this moment as "indispensable to the approach of depth hermeneutics" and also observes that,

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<sup>4</sup>A pre-interpreted territory, according to Thompson (2011, p. 358), is a symbolic form that is already the result of a previous interpretation and, when interpreted again, will result in an "interpretation of interpretation" or, simply, a re-interpretation.

<sup>5</sup> According to Thompson (2011, p. 359), the term "field-subject-object" refers to subjects who have already interpreted the "field-object" of the research and, thus, are also part of the analysis/interpretation.

through “[...] interviews, participant observation and other types of ethnographic research, we can reconstruct how symbolic forms are interpreted and understood in the various contexts of social life.”

Thus, with the support of Thompson’s concepts and, through depth hermeneutics, it is possible to examine how the transformations that occurred in the society from the state of Rio Grande do Sul directly influenced the mathematics teaching of the course and of the institution observed, so that, through the narrative of these historical events, the relationships between the changes and their effects on the reformulations of the curriculum matrices and curriculum in the mathematics teaching of the technical school *Liberato Salzano Vieira da Cunha* during the time frame observed were pointed out.

The historical time frame of 1967 brought with it significant changes in education, as mentioned in the analysis of education in Canoas. The pace of industrialisation was intense, since Brazil lived the so-called “economic miracle,” which extended, consequently, to Rio Grande do Sul. The footwear industry in the Vale dos Sinos region made of Rio Grande do Sul the leading footwear manufacturer in Brazil, installing companies focused on the production of machines to meet the demands of the footwear industrial park established in the region.

This contextualisation corroborates Souza and Muller (2002 p.13), who point out in their studies that “[...] the development of the local industry and the treatment of leather and the production of footwear knew between the 1950s and 1970s its golden period.”

Souza and Muller (2002, p.15) also point to a situation in which “the chaotic scenario of vocational secondary education, between the 1960s and 1970s” is characterised, with Novo Hamburgo community’s intense mobilisation, which had already begun in 1956. Thus, in October of the same year, Mr. Hippólito Brum officiated the president of Novo Hamburgo legislature, Guilherme Becker, who triggered a strong campaign towards other members of the city, articulating with solid arguments regarding economic position, tax contribution, and social, technical, and professional problems, which eventually induced the government to designate Novo Hamburgo as the seat of the future technical school.

Thus, as verified in the historical collection of Escola Liberato Salzano Vieira da Cunha, on March 8, 1957, more precisely at noon, at the headquarters of the city of Novo Hamburgo, an agreement was signed, summing the efforts

of the municipality, the state and Brazilian central power to make viable the technical school Liberato Salzano Vieira da Cunha. Each instance of power was responsible for a part of the work. The municipality was responsible for donating the land area, the union was responsible for the construction of the building and supply of equipment, and the state of Rio Grande do Sul was responsible (and still is) for the maintenance of the physical and human resources.

After ten years, in 1967, through ordinance 9.086/67, the operation of that technical course in chemistry, our object of study, was authorised. Following, through ordinance 8537/70 of the *Diário do Estado do Rio Grande do Sul*, the technical course in chemistry was recognised, and two others, mechanics and electrotechnology, were authorised.

Regarding the official documents raised, the year 1971 stands out, as, during the military period, there was substantial investment policy in the national content industry. The second Law of Guidelines and Bases of Brazilian Education (Law 5.692, of August 11, 1971) entered into force, bringing with it a “[...] universal and compulsory professionalisation for secondary education” (Manfredi, 2002, p. 105), and a much clearer and definitive guidance in relation to the contents taught in technical education, including bringing forward the following year a Review (CFE Review 45, of January 12, 1972) establishing the minimum contents to be taught in technical education for the courses already existing.

This Review is prodigal for definitions of the curricular matrices for mathematics teaching in technical schools. Thus, it is also important to note that the objectives of the technical education and this Review in particular are very clear. They are explained through chapter 5, *Objetivos do Ensino Técnico - Secundário* (Objectives of Technical Education - Secondary), showing that:

Initiation to work will generally take place in didactic environments already known as the development of industrial arts, commercial practices and services, agricultural practices and home education (Brasil, 1972).

Concerning the minimum requirements for a technical course, Review 45/72 highlights a minimum workload established for each speciality. For chemistry, the workload was of 2,910 hours, and, the disciplines were then treated as subject matters (*matérias*)...



[...] constitute the minimum for the qualification of the technician in the various modalities are those listed in the Annex to the DOCUMENT, according to the sets of related qualifications or isolated qualifications for the branches studied. To compose the minimum required for each of the other qualifications, the educational institution will use the same subjects provided for the technical course, grouping them properly so that the content can necessarily provide the student with knowledge and skills that enable him to perform the respective occupation. As these are minimum requirements, it is appropriate that the school consult the institutions of the branch chosen (factories, industries, institutions of the sector) to add those other subjects necessary or useful to the region. (Brasil, 1972)

As can be seen in the text of the Review, there is a double concern regarding the disciplines (and consequently the contents) and the curriculum: the first, dealing with the minimum information that a professional should receive to perform their activity, and the second, from recognising this minimum, a possibility of “adding those necessary or useful subjects to the region” (Brasil, 1972).

However, due to the lack of conditions to articulate a general education system with vocational training, “[...] the law underwent, in a short period, several modifications until that, in 1982, Law 7.044 was in force [...]” (Manfredi, 2002, p.106)

Also, according to the same author, this law brought again the possibility of dividing high school between general education and technical education, which, in a way, had already been contemplated in a previous opinion (MEC 76/75), in which this same possibility had already been foreseen.

The military period ended in 1985 and, according to Rocha’s studies (2013), with the election of the first civilian president after 1964, although indirectly. On December 20, 1996, Law 9.394/96 was enacted and sanctioned by the then-President Fernando Henrique Cardoso, still in force today with a set of changes that have occurred in recent decades.

This highlight is only to historically situate the excerpt of this study, because this law will not be the object of appreciation in this work. Due to the

number of elements, reviews and other associated documents, it would deserve new and exclusive research.

Thus, the result of the research regarding technical education in Brazil is evidenced. We rescued the historical periods from the year of foundation to 1995, permeating the main social and political moments of our past, listing and exposing the changes of each of the decrees and reviews edited about our object of study.

When conducting a historical study, one cannot guarantee the fullness of the scope of the facts. However, the different socio-political moments end up forming historical cycles in which education is, through fields of knowledge, compelled to encompass social demands. Likewise, we should say that before arriving at the documents located in the research, it was necessary to situate some historical moments of our state, to establish the same parallels already verified in the history of the country with the materials collected directly from that institution. The period preceding the approval of the third Law of Guidelines and Bases of Education is the “upper time frame,” since this should be studied separately, also taking into account the historical context involved and the number of official documents and other research materials.

Thus, we intended to show that, when organised in periods, time becomes feasible to be historicised by a cohesive narrative devoid of conspicuous startles. Continuities and ruptures are inherent to the historical process. Thus, the historical processes analysed show it is possible, either for reasons of legislation, political aspects, socioeconomic injunctions, or for reasons of analysis, to understand the narrative of history in periods, by grouping facts, events, and alignments that make a particular historical moment peculiar, and thus amenable, to be periodised.

Even with such convictions, it is essential to allude to the multiple interpretations that the phenomena analysed can generate in the future or today. Le Goff (1991) points out:

I will quote a well-known phrase, which has been repeated by several scientists, and particularly by the Italian philosopher Benedetto Croce: “All history is contemporary.” The past continues to be interpreted, it is always a contemporary reading that is made and, in understanding the past, we must integrate this renewed reading, always restarted. (Le Goff, in an interview with Augras, 1991, p. 263)

## FINAL CONSIDERATIONS

When analysing the historiographical research cited throughout the article, we realised that, besides the common factors: “history of mathematics teaching” and “depth hermeneutics,” periodisation contributed significantly to understanding the historical processes in question.

The history of societies, institutions, disciplines, and curricula are processes in motion, being written and interpreted considering time as an element of history, making it imperative to have them organised in the face of criteria such as those enunciated by periodisation.

In this perspective, understanding the periods and the underlying processes that characterise them represents a fruitful way of understanding, for example, the 76 years of educational history in a municipality, analysing from dawn to the present day. Changes in legislation, government policies, and also standpoints on the role that education should play are, in themselves, elements that generate discontinuities in time, signalling the presence of periods of analysis before relevant milestones for the occurrence of conspicuous changes in the historical development of the case in question.

Regarding the historical process of teaching mathematics in the chemistry course, we noticed the delimitation of time frames and their peculiarities. And, even before this temporal characterisation, we also needed to evaluate and interpret the relations of historical context, because whenever there were changes in laws, reviews, and decrees, a set of changes in course plans and curriculum matrices had to have occurred. That is, discontinuities triggered a rupture process that leads to the idea of periodisation.

The comings and goings during military governments regarding the professionalisation of the high school of the time generated ruptures in a shorter period, which can also be analysed by periodisation.

It can also be stated that in relation to the research analysed, new and unknown periods have occurred, for example, concerning the phenomena that occurred after 2016 in mathematics teaching in the municipal schools of Canoas, or in mathematics teaching in the technical course in chemistry of Escola Liberato Salzano.

Those statements are subject to investigation and, when we analyse Le Goff's work, we can affirm that the research can be periodised, either due to decrees, laws, or reviews, or due to particularities or changes in some educational system.

If continuity allows us to understand the chain of phenomena throughout the ages, the periodisation of history can go hand in hand with depth hermeneutics as an auxiliary line of analysis, constituting a relevant tool for "time control." If, on the one hand, depth hermeneutics is used to interpret the movements of humanity, periodisation, on the other hand, allows us to historicise, in a harmonious way, the binomial rupture/movement.

Whether the narratives are long or not, the periods remain fruitful in the domain of objects of study, narratives, institutions, and individuals susceptible to historicisation. Those, once circumspect, favour the task of interpretation through depth hermeneutics and, as it was possible to demonstrate in this article, its articulation with periodisation can constitute complementary references for historiographical studies in mathematics teaching.

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This article was prepared and organised by the four authors. FLR and AAH were responsible for the development of the theoretical framework and data organisation, AB was responsible for theoretical and methodological guidance and RADF was responsible for theoretical contributions of the reference and corrections for textual fluency. The four authors jointly constructed the analyses and the final considerations, making the text a collective composition.

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