10.46551/emd.v9n18a03 ISSN 2526-6136

Educação Matemática Debate

Curriculum silences: a post-critical analysis of the IFNMG Mathematics degree program

Abstract: This paper presents an excerpt from ongoing doctoral research in the field of Mathematics teaching. The study aims to investigate how issues of diversity and social problems are represented and negotiated in the curriculum of the Mathematics degree course at the Federal Institute of Northern Minas Gerais, Salinas campus, using post-critical curriculum theories as a reference. The methodology adopted was content analysis, applied to the curriculum document, with the data interpreted in the light of curriculum theory. The results show limitations in textual organization, a superficial approach to diversity and social issues, and a silencing of gender asymmetries in the context of Mathematics.

Keywords: Curriculum. Post-Critical Theories. Mathematics. Teacher Education.

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Received • 21/06/2024
Accepted • 25/10/2024
Published • 10/08/2025

Editor • Gilberto Januario

ARTICLE

Silencios curriculares: un análisis poscrítico de la licenciatura en Matemáticas del IFNMG

Resumen: Este trabajo presenta un recorte de una investigación doctoral en curso, en el ámbito de la enseñanza de las Matemáticas. El estudio tiene como objetivo investigar cómo las cuestiones de diversidad y problemáticas sociales son representadas y negociadas en el currículo de la Licenciatura en Matemáticas del Instituto Federal del Norte de Minas Gerais, campus Salinas, tomando como marco teórico las teorías poscríticas del currículo. La metodología adoptada fue el análisis de contenido, aplicado al documento curricular, con los datos interpretados a la luz de la teoría del currículo. Los resultados evidencian limitaciones en la organización textual, un abordaje superficial de las temáticas de diversidad y cuestiones sociales, además de un silenciamiento en relación a las asimetrías de género en el contexto de las Matemáticas.

Palabras clave: Curriculum. Teorías Poscriticas. Matemáticas. Formación de Profesores.

Silêncios curriculares: uma análise pós-crítica da licenciatura em Matemática do IFNMG

Resumo: Este trabalho apresenta um recorte de pesquisa de doutorado em andamento, inserida no campo do ensino de Matemática. O estudo tem como objetivo investigar como as questões de diversidade e problemáticas sociais são representadas e negociadas no currículo do curso de Licenciatura em Matemática do Instituto Federal do Norte de Minas Gerais, *campus* Salinas, tomando como referencial as teorias pós-críticas de currículo. A metodologia adotada foi a análise de conteúdo, aplicada ao documento curricular, com os dados interpretados à luz da teoria de currículo. Os resultados evidenciam limitações na organização textual, uma abordagem superficial das temáticas de diversidade e questões sociais, além de um silenciamento em relação às assimetrias de gênero no contexto da Matemática.

Palavras-chave: Currículo. Teorias Pós-Críticas. Matemática. Formação de Professores.

1 Introduction

The curriculum is a power relationship, a text, a discourse, a document. Our identity is

forged in the curriculum (Silva, 2005). It was based on these concepts that, as a teacher of the subject *Didactics of Mathematics*, I discussed the imbrications of the Mathematics curriculum from the perspective of diversity with the students on the Mathematics degree course at the Universidade Estadual Paulista (Unesp).

As a critical and reflective teacher, I was concerned about the initial training of these students, as many of their learning experiences were *limited* to mathematics for mathematics' sake. Although we don't see any problems with this, we agree with Guststein and Bartell, cited by Skovsmose (2017), who emphasize the importance of reading and writing the world with the help of mathematics, in order to use it as a way of interpreting and acting in the world. For Skovsmose (2017), "mathematics can be effectively used to teach and learn about issues of social injustice, helping to develop a critical consciousness that provides them with the tools to deepen their knowledge of (and understanding of) the socio-political context of their lives" (p. 21).

In this context, it is necessary to reflect on the role of mathematics (and school) in relation to society, since it has the potential to develop the thinking and skills needed to face the challenges that permeate society. Likewise, we can't be so short-sighted as to see it only from a Cartesian viewpoint, which is positivist, distant and bordering on self-sufficiency. We know that every action is laden with intentionality, and criticality is the eyewash that allows us to see it as part of a system designed to perpetuate the habitus established at its base.

We wrote this paper based on this premise. Although this is not our focus, but rather an offshoot of the objective put forward, we want to understand how the second largest teacher training center in the north of Minas Gerais mobilizes itself with regard to the issues raised in this study. It is worth noting that teaching involves working with people, dealing directly with identities, subjectivities, social and emotional strata. In this sense, the question is: how does the Mathematics degree course at the Federal Institute of Northern Minas Gerais (IFNMG), Salinas campus, align itself with these complexities that are increasingly relevant in the contemporary scenario? In personal terms, how much responsibility do we have in this process? And, more broadly, what is our contribution to these and other social issues?

Finally, without trying to make it too tedious to read, this paper is organized into three sections, in addition to this introductory text, the methodological section and the final recommendations. The first section presents the creation of the Mathematics degree course at the IFNMG Salinas campus, with an emphasis on its epistemological nature. The second section interweaves the discussions and dimensions proposed by post-critical curriculum theories with the field of mathematics teaching and learning. Finally, in the last section, the analysis is presented, based on a critical reading of the corpus in question.

2 The path of research

The research in this paper seeks to examine how issues of diversity and social problems are represented/negotiated in the curriculum of the Mathematics degree course at IFNMG, Salinas campus, using post-critical curriculum theories. The choice of this course is justified for two main reasons: firstly, the fact that both the institution and the course are the locus where I am carrying out my broader research; secondly, because my initial training in Mathematics was in this academic context, which provides a deep and contextualized understanding for the proposed analysis.

Of a subjective nature, this research is based on a qualitative approach of a descriptive-exploratory nature, since it makes it possible to connect various variables and allows in-depth exploration of the material under analysis, contributing to understanding the problem in question. It is also classified as a documentary study.

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To analyze the material, we used Bardin's (1977) scientific project of content analysis. As proposed by the author, this approach comprises three essential stages: (a) pre-analysis, (b) exploration of the material and (c) treatment of the results, inference and interpretation.

(a) *Pre-analysis stage*: in this stage, the initial ideas of the research were organized and systematized. The process began with a visit to the institutional website of the IFNMG, Salinas campus, whose *floating reading* made it possible to collect and make substantial notes on the history and justification for the implementation of the course, its curriculum structure, the syllabus of the subjects and their arrangement throughout the course. The document was then downloaded and analyzed.

(b) *Material exploration stage:* in this stage, the document was subjected to a visceral reading, taking into account the elements mentioned in the previous stage. Based on the scope of the research, an *inventory* was drawn up, in which the textual elements were isolated and *classified* according to their axiological and epistemological nature. During the exploration of the material, in order to inventory the corpus analyzed, passages were highlighted that directly or indirectly reflected the guidelines of post-critical curriculum theories, highlighting the representation of issues of diversity and social problems.

(c) *Treatment of the results and interpretation:* in this stage, the data was analyzed in the light of the proposed objective, finding support and validity in the theories of gender and Mathematics Education. The analysis considered an inventory made up of textual elements that touch on the axiological organization of the curriculum, examining how the information was presented, the presence of elements proposed by post-critical curriculum theory and the representation of diversity issues and social problems in the syllabus.

Finally, a complementary reading of the Pedagogical Course Project (PPC) was carried out in order to substantiate the analysis and identify how gender, race, class and sexuality issues are dealt with throughout the course, considering the possibility that these elements were more explicit in this document.

3 The context of the Degree in Mathematics at IFNMG - Salinas campus

When we focus on the historical panorama of education in Minas Gerais, we realize that it was not exempt from the problems and reforms that permeated the Brazilian educational scenario. Reis (2017), for example, points out that education in Minas Gerais was founded on the ideology of *mineiridade*, in which its conservative policies favored economic development over other social reforms, as well as being aligned with the interests of local elites. This outlook was also reflected in the immanence of education, in which higher education appeared in political speeches and projects as a means of training human capital for the development of national capitalism.

As the north of Minas Gerais went through the process of modernization, the need to expand the supply of higher education emerged, linked to regional development. For Rota Jr. and Ide (2016, p. 151), this movement began to “demand higher levels of schooling from the population, something that could be seen as a factor holding back the process of modernization and development in the region”. In the authors' view, this dynamic aimed to prepare individuals for the new challenges imposed by the contemporary context.

Following the developmentalist logic, the “1990s provided essential contextual elements to understand the discussions on the conditions of access, permanence, democratization and universalization of public higher education in Brazil” (Lima, 2013, p. 85). The Lula government, through the Education Development Plan (PDE), promoted a fruitful

advance in this direction. Amorim (2013, p. 55) observes that "as an expression of the Lula government's commitment to investing in Professional Education in Brazil [...] a process of expansion and reorganization of this type of education began in 2006". Vocational Education was thus defined as a priority, fostering the qualification of labor for the productive sector and the promotion of "territorial ordering, allowing quality education to be accessible to the most remote regions of the country" (Lima, 2013, p. 89).

In this sense, "the federal government created the *Brasil Profissionalizado* program in 2007, which aimed to modernize and expand the public high school network integrated with professional education", inserting and articulating "the world of work and the sciences and supporting public schools" (Brasil, 2007, p. 33). Later, on December 29, 2008, under Law No. 11.892, the Federal Network of Professional, Scientific and Technological Education was established, culminating in the creation of the Federal Institutes of Education, Science and Technology. The Federal Institute of Northern Minas Gerais, Salinas campus — transformation of the now defunct Salinas Federal Agrotechnical School —, was set up with the ultimate commitment to promoting public education of excellence, integrating teaching, research and extension, with a view to expanding the technical and technological development of the Salinas region.

Among its Technical Courses Integrated to High School, Undergraduate (Bachelor's and Bachelor's), Master's and Initial Continuing Training for Workers (FIC), the Mathematics Degree course, implemented in 2009, stands out. Its creation was motivated by the need to improve Mathematics performance rates, whose unsatisfactory results were also affecting the northern region of Minas Gerais.

Although professional training in the area had been offered by the State University of Montes Claros since the 1960s, access was restricted to a privileged group, mostly made up of the regional bourgeoisie. In this context, the Mathematics degree course at the IFNMG, Salinas campus, emerged as a response to local demand, aiming to quickly, effectively and with quality reverse the critical scenario of teaching and learning in this subject.

Its central objective is to train and qualify teachers for Basic Education in the area of Mathematics, considering dynamic and motivating learning contexts, as well as providing a coherent articulation between theory and practice, stimulating and favoring research (IFNMG, 2023, p. 13).

The course aims to "train teachers to teach Mathematics in Basic Education (final years of Primary and Secondary Education), based on the articulation between theory and practice, committed to regional social, cultural and economic contexts" (IFNMG, 2023, p. 16). In this sense, it seeks to train educators committed to the development of mathematical knowledge, anchored in the constructionist approach and linked to the experiences of the learner. In addition, it is committed to promoting training based on *"a perspective that respects what is different in a complex, contradictory society, permeated by inequality and at the same time with immense possibilities of being transformed"* (IFNMG, 2023, p. 14, emphasis added).

We can see, therefore, that the north of Minas Gerais not only aligned itself with the demands arising from the modernization process, but also remained attentive to the educational and development needs of the region. Thus, we can see its efforts to improve the quality of education, especially in the field of mathematics, preparing teachers to work in this area and, above all, showing sensitivity to the diversity present in the educational scenario.

Finally, structurally, the course offers 40 annual places in the face-to-face mode, of which 50% are filled through the traditional entrance exam and 50% through the Unified Selection System (SISU). With a total workload of 3,200 hours, the course is organized into 8 semesters, with a minimum duration of 4 years and a maximum of 6 years, and classes are

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offered exclusively in the evening.

4 The mathematics curriculum from a post-critical perspective

Thinking about the guidelines intrinsic to curriculum documents means reflecting on the different cultures, scenarios and power relations that permeate training spaces, whether in elementary school or universities. Tião Rocha, in an interview with Folha de S. Paulo (2007), was categorical in problematizing the role of education in society, highlighting the importance of social, historical and pedagogical factors that coexist in teaching and curriculum organization.

Contrary to common sense, the curriculum is not a list of systematized knowledge organized in a grid to be taught, whose treatment is distant from subjectivities. On the contrary, it encompasses social, emotional and ideological aspects, as well as constituting subjects and societies through the institutional apparatuses that involve schools and education.

As a constantly evolving document, the curriculum overcomes modern understandings that seek to control, standardize and hegemonize the subjectivities of individuals. Its culture must explore *other* realities, as Sacristán (1998) points out when referring to the curriculum as an *object of arrival*. Santos and Miola (2024, p. 14) see this document as a kaleidoscope, configured as "a frontier, hybrid, mestizo and multifaceted curriculum that can be exercised". This is because the school, being heterogeneous and receiving students from different social backgrounds, should not be configured as an institution that only reproduces the social and economic structures of society, as it also has informal practices and more localized social relations (Pereira, 2017).

When thinking about the curriculum, Sacristán (1998, p. 15-16) states that it should be constructed as

> a praxis rather than a static object emanating from a coherent model of thinking about education or the necessary learning of children and young people, which is not limited to the explicit part of the cultural socialization project in schools. It is a practice, an expression of the socializing and cultural function that a given institution has, which regroups around it a series of different subsystems or practices, among which is the pedagogical practice developed in school institutions that we commonly call teaching.

Adopting this concept implies adhering to a theoretical-methodological perspective that contrasts with the concept previously mentioned, in which the curriculum is restricted to defining objectives and content to be taught sequentially during the stages of schooling. For Skovsmose (2001), this approach requires rethinking forms of knowledge that consider different perspectives on mathematical knowledge, since "rigorous, axiomatic mathematics systematized in rules is no longer the only legitimate cultural option for interpreting mathematical school knowledge" (Pires, 2013, p. 32).

In this way, we understand that school, the curriculum and mathematics itself not only have historical dimensions, but are also contemporary spaces whose construction, organization and methodology do not follow a linear path. Instead, they are marked by ruptures and continuities, challenging the progressive-evolutionary logic. As complex and socially produced phenomena, they emerge from the historical, political and cultural context in which they are inserted, which makes their organizing documents valuable sources for a deeper understanding of these processes.

From this perspective, curriculum theories are influenced by the new political and social

demands that permeate society and are incorporated into the educational scenario. Their contributions offer different perspectives for the construction of curricula, each responding to the emerging needs of educational processes. In a fluid way, traditional theories are rooted in the ideals of Franklin Bobbit, John Dewey and Ralph Tyler, who conceived of the curriculum as a body of knowledge to be mastered by students, with a focus on the transmission of content.

Influenced by the new sociology of education, critical theories have as their precursors Paulo Freire, Louis Althusser and Michael Apple, whose concerns reflect social inequalities and injustices, emphasizing the critical and autonomous capacity of students to question and transform their social realities. In contrast to critical theories, which emerged in opposition to traditional theories, post-critical theories expand critical theorizing, deepening discussions about whom the curriculum serves (Santos and Miola, 2024). By questioning the epistemological bases of their predecessors, post-critical theories distance themselves from critical theories that focus on class struggles.

Spreading rhizomatically throughout the social fabric, post-critical curriculum theories are influenced by currents of post-modernism, post-structuralism, post-colonialism, cultural studies and multiculturalism, with an emphasis on the relationship between curriculum and the construction of identities/subjectivities. In diverging from unitary conceptions of the subject, these theories are based on studies of school culture, questioning which culture is privileged by the school and how it deals with the cultural differences of social groups. Post-critical curriculum theorists cover approaches such as multiculturalism, gender, feminism and queer theory, among others.

From this perspective, we adopted the interactionist view of school culture, which focuses on the school's organizational culture. Considering the specificities of each educational institution, it is understood that "'culture' [is] produced by organizational actors in their relationships with each other, in their relationships with space and in their relationships with knowledge" (Barroso, 2013, 182). Thus, its cultural production is polysemic, distancing itself from conservative, repetitive and conformist conceptions.

The approach of post-critical theories of curriculum is essential to understanding this conception because, according to Pacheco (2013), they start from different conceptual assumptions, with the valorization of identity as a common denominator. In addition to prioritizing the personal over the social, these theories reject metanarratives, affirm difference and seek emancipation through deconstruction. Characterized by heterogeneity and plurality, they are structured in an acentric way in terms of the hierarchies of analysis, understanding identity as a construction based on difference (Pacheco, 2013). In opposition to universality and utopia, they consider that all discourse is impregnated with power and seeks to open up "new possible spaces for human action, particularly for the action of the most dominated, rejecting the fate of memorization and oblivion that structuralism had brought them" (Pacheco, 2013, p. 13).

Table 1 shows the differences between each theory, but we would venture to say that, based on empirical evidence, in school pedagogical practices, it is the traditional theories that prevail. This is because the Brazilian educational project is still tied to the politics of the nation-state, which aims to conform (unilaterally) individuals/students to live under its aegis (Pereira, 2017).

As Table 1 reiterates, critical theory focuses on the criticality and emancipation of the working class, which is forced to live under the aegis of the dominant/bourgeois culture. In a complementary way, post-critical theory explores knowledge-power relations at school, subjectivities, multiculturalism and cultural, racial, ethnic and gender differences. However, it is important to point out that critical theorists also problematize these issues; however, their

reflections focus on "the analysis of school failure on the part of minority class students, as well as the mechanisms and institutions that would be at the root of this situation" (Santos and Miola, 2024, p. 21). Thus, they fail to question, for example, the "type of knowledge that was at the heart of the curriculum that was offered to children and young people belonging to those groups" (Silva, 2016, p. 99), which can consequently repress realities and promote a verticalized dialogue.

Table 1: Concepts emphasized in the different curriculum theories

Traditional Theories	Critical Theories	Post-Critical Theories
Teaching	Ideology	Identity, alterity, difference
Learning	Cultural and social reproduction	Subjectivity
Evaluation	Power	Meaning and discourse
Methodology	Social class	Knowledge-power
Didactics	Capitalism	Representation
Organization	Social relations of production	Culture
Planning	Conscientization, emancipation and liberation	Gender, race, ethnicity, sexuality
Efficiency	Hidden curriculum	Multiculturalism
Objectives	Resistance	—

Source: Prepared from Silva (2016, p. 17)

In this scenario, research in Mathematics Education/Teaching has shown how classes in this subject contribute to the production of differences, when analyzing the teaching and learning process between male and female students. For example, Barbosa (2016), when analyzing the narratives of teachers, reveals that the imaginary belief that girls have a slower cognitive process in mathematics negatively impacts their academic development in this subject. A similar result was found by Santos and Cardoso (2016), who, through ethnography, point out that teachers do not invest in girls in math classes. According to the authors, the lessons are mainly aimed at boys, who are more often invited to answer activities on the board, as well as having their names used more often in the formulation of mathematical problems.

Although panoramic, the examples presented illustrate how curricula — including pedagogical practices and didactic technologies — are organized to reflect the naturalized valorization of Eurocentric and gendrified knowledge. This arrangement makes teachers and students perceive such knowledge as superior "in the evaluative and utilitarian hierarchy in relation to those local, belonging to people who live and coexist in communities" (Munsberg, Funchs and Silva, 2019, p. 597). Faced with this asymmetry, it becomes necessary to learn how to unlearn, adopting a critical stance that challenges the rhinoceros position described by Ionesco and allows us to place ourselves in the perspective of the other.

In this direction, the ethnomathematics program has emerged as a strategic ally, questioning the Eurocentric influence on the curriculum and promoting the teaching of mathematics based on local, indigenous and quilombola knowledge, among others. In addition, it opposes tradition by allowing geometry to be taught on the basis of specific cultural elements, such as Mayan architecture (Kukulcán Temple/Pyramid). It does not, however, suggest the

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elimination of the Cartesian conception of mathematics, but rather the possibility of teaching and learning this subject in the light of plural approaches, detached from a unitary conception of knowledge. Furthermore, it is the responsibility of teachers to respect and promote the diverse identities, ways of learning, masculinities and femininities present in the school community, in order to deconstruct the signs that permeate the school as a whole.

Finally, we note that post-critical curriculum theory represents a paradigmatic shift in school mathematics, challenging our personal and world conceptions. By considering the complexity of students' subjectivities and identities, this approach promotes more inclusive and diverse teaching and learning, integrating other knowledges that problematize the power relations inherent in the curriculum. However, its implementation faces methodological obstacles, since traditional theories continue to prevail in teaching practices. A continuous effort is therefore needed to put this approach into practice, with the aim of transforming educational systems and ensuring a mathematical education that values students' experiences, subjectivities and identities.

5 Analysis and discussion

As already mentioned, this research seeks to examine how issues of diversity and social problems are represented/negotiated in the curriculum of the Mathematics degree course at IFNMG, Salinas campus, using post-critical curriculum theories. However, during the analysis of the syllabus, we came across instrumental divergences that made its axiological domain noteworthy.

Although the syllabus in question is not specifically academic research, but a by-product of it, its function is to present the interested community with organizational information about the curriculum structure of the course in question. As it represents the first institutional contact between the parties, it must be axiologically organized, including grammatical structure, standardized formatting and a close relationship with technical norms.

At a basic level, it can be seen that the entire document needs technical, instrumental and grammatical revision, since the absence of graphic signs and the lack of standardization are evident throughout the text. There are inconsistencies in the lists of references, such as authors/authors with incorrect names — "ANTON and HORRES" (p. 19) —, absence of authors and year of publication (p. 55) and incomplete titles of works, such as *A produção do Fracasso Escolar*[1] (p. 23). In addition, the references are poorly structured and formatted. In some cases, the authors' names are written in full, in others they are abbreviated. There is also variation in the formatting of titles and means of publication, as titles are not highlighted, while others are in bold or italics, not respecting the indications proposed by the Brazilian Association of Standards and Techniques (ABNT).

We noticed that the curriculum for the Mathematics degree course at the Salinas campus lacks standardization, leaving room for individuality in the process and a lack of commitment to the uniformity of the document. In general terms, this situation resembles the dynamics of academic activities carried out in groups, in which each member carries out their part in isolation and then integrates it with the others without a proper final review. In addition, we noticed the presence of two subjects aimed at developing/improving academic writing: Research Methods and Techniques (40h/c) and Reading and Producing Academic Texts (40h/c). However, these subjects focus on the application of technical standards for academic work.

As established in article 12 of the National Curriculum Guidelines for university

[1] PATTO, Maria Helena Souza. *A produção do fracasso escolar:* histórias de submissão e rebeldia. São Paulo: Instituto de Psicologia da Universidade de São Paulo, 1990.

education, the course's curriculum structure is made up of three cores, in addition to the Supervised Internship (480h/c). These nuclei are defined as follows: 1) General Training Studies Nucleus (880h/c): includes pedagogical and instrumental training subjects, as well as addressing general aspects of Education; 2) Deepening and Diversifying Studies Nucleus (1560h/c): includes subjects specific to Mathematics; and 3) Integrating Studies Nucleus for Curriculum Enrichment (920h/c): includes activities such as seminars, technical visits, Course Conclusion Work and scientific initiation projects, among others.

Table 2: Curriculum organization of the Mathematics degree course at IFNMG, Salinas campus

Nucleus	Courses	Workload (h/c)
General education studies	Introduction to Computer Programming	40
	Instrumental Portuguese I	40
	Philosophical Foundations of Education	40
	Study and Research Methods and Techniques	40
	Psychology of Development and Learning	40
	General Physics I	80
	Education, Society and Work	40
	Didactics I	40
	General Physics II	60
	Didactics II	40
	General Physics III	60
	Knowledge Production and Management	40
	Reading and Producing Academic Texts	40
	LIBRAS I (Brazilian Sign Language)	40
	School Organization and Pedagogical Management	40
	Basic Statistics	80
	Professional Education	40
	LIBRAS II (Brazilian Sign Language)	40
	Education for Diversity	40
Total core	19 courses	880
Center for deepening and diversifying studies	Fundamentals of Elementary Mathematics I	80
	Euclidean Plane Geometry	80
	Analytical Geometry I	80
	History of Mathematics	40
	Geometric constructions	40
	Analytical Geometry II	80
	Fundamentals of Elementary Mathematics II	80
	Linear Algebra I	80
	Spatial Geometry	80
	Differential and Integral Calculus I	120
	Linear Algebra II	80

	Differential and Integral Calculus II	80
	Financial Mathematics	40
	Numerical Calculus	80
	Introduction to Arithmetic Number Theory	80
	Differential and Integral Calculus III	80
	Algebraic Structures	80
	Metric Spaces	60
	Ordinary Differential Equations	80
	Functions of a Complex Variable	80
	Introduction to Real Analysis	60
Total core	21 courses	1560
Nucleus of integrative studies for curriculum enrichment	Pedagogical Practice I: Introduction to Teaching Practice	40
	Pedagogical Practice II: Planning and Practice	40
	UCE 01: Construction of Teaching Materials Project	80
	UCE 02: Technologies in Education Project	80
	Pedagogical Practice III: Mathematics Education	40
	UCE 03: Projeto Matemática em dia	80
	Pedagogical Practice IV: LEM I - Mathematics Education Laboratory I	40
	Supervised Internship I(120 h/c)	120
	UCE 04: Mathematics Teacher Training Project	80
	Supervised Internship II (120 h/c)	120
	UCE 05: Socializing training experiences	80
	Pedagogical Practice V: LEM II - Mathematics Education Laboratory II	40
	Course Conclusion Work – TCC I	40
	Supervised Internship III (120 h/c)	120
	Course Conclusion Work – TCC II	40
	Supervised Internship IV (120 h/c)	120
Total Core	16 courses	1160+240 (A.A.C.C)

Source: Own elaboration based on IFNMG (2023)

Table 2 shows the relative parity between the subjects in the first two clusters (pedagogical and specific), considering the sum of the number of subjects and the workload for teacher training. The third core complements this training by integrating the Theoretical-Practical Activities of Deepening (A.A.C.C), Supervised Internships and Extension Activities linked to the basic school. These activities enable the practical application of theoretical knowledge, allowing future teachers to "communicate, interpret the reality studied and create connections with social life" (IFNMG, 2023, p. 40).

However, we noticed that there is no subject dedicated to discussing issues of gender, class, race, ethnicity and sexuality, which are constituent elements of students' subjectivities

and identities, as pointed out by post-critical curriculum theories. Despite this, reading the syllabus revealed that these elements appear, albeit in a short-sighted way, in some of the first core subjects. We even believe that *Didactics II* can promote a discussion of the curriculum, as its syllabus suggests studying the general theory of the curriculum, covering traditional, critical and post-critical theories, as well as approaching the curriculum from a global perspective, taking into account historical, cultural and social contexts.

However, there is still uncertainty as to the depth of this approach, since the complementary bibliography includes the works of Michael Apple and Tomas Tadeu da Silva, authors widely recognized in the dissemination of these theories, but whose inclusion as complementary reading may limit the necessary critical deepening.

Epistemologically, the subject History of Mathematics is limited in relation to contemporaneity. If, as Pinsky (2016) suggests, all history is essentially contemporary, it is worth questioning what historical narrative the course intends to construct by reproducing a discourse that traditionally excludes the contributions of women and societies from the Global South. This questioning is in line with Chimamanda Ngozi Adichie's (2019) reflection on the danger of a single (Western) history, which, by claiming universality, can dehumanize, stigmatize or fragment the dignity of a people. Furthermore, the canonization of Carl Boyer is problematic. Although his work has historical value, his History of Mathematics has been criticized for its lack of didactic updating, absence of references and sources for quotations, disregard for the social issues involved in mathematical discoveries, factual errors and its obsolescence (Abreu *et al.*, 2020).

In view of this, it should be pointed out that, in making this criticism, we are not suggesting that this discipline should look to the past for a fictitious key that guides the understanding of the current scenario (Mathematics), but that it should try to "shed light on the past through the present, hoping that the light reflected by the past thus illuminated will reveal areas of the present that remain obscure" (Cunha, 2007, p. 15). In *other* words, other mathematics; a sign of plurality.

This reflection is substantial, as the subject *Pedagogical Practice 3: Mathematics Education* includes both the study of conceptions of mathematics and how it is carried out by different ethnic-cultural groups through ethnomathematics. The internalist mode of historical narrative used by both Boyer and Howard Eves treats the different mathematics in a static and individual way. We note that there is a certain divergence between some of the disciplines in the first core, resulting in two trivial implications: (a) a vertical epistemological relationship between the disciplines and (b) a lack of criticality in relation to the proposed knowledge, which may disregard it as political.

However, these implications seem paradoxical in the sense that the subjects *Education, Society and Labor and Philosophical Foundations* of Education have dialogue, criticality and political sense as their driving forces. This makes sense, since one cannot discuss the production of social inequalities and educational opportunities without resorting to these attributes. The reference to Professor Marilena Chauí is proof of this, given her critical rigor and her profound philosophical and political thinking.

A priori, the subject *Education for Diversity* seemed to be the closest to the discussions in this work, due to the nature of its title. According to its syllabus, the subject covers topics such as inclusive education, ethnic-cultural diversity (Afro-Brazilian, indigenous and peasant), plurality, differences and inequalities in society, gender, sexual orientation and socio-educational measures. However, the bibliographic list, both basic and complementary, does not present references that support these discussions. In addition to not intersecting the specificities of Mathematics Education/Teaching, the term *diversity* can easily be reduced to *people with*

disabilities. Although there is no problem with this, we believe that the subject would need to be restructured in order to cover its entire scope.

It follows that the subject of *gender*, although mentioned in the syllabus, is not discussed in depth in the references. This suggests, to a certain extent, that this discussion, when and if it exists, is left to the discretion of the teachers when planning and conducting their lessons. However, as not everyone feels prepared to address this issue, it tends to be avoided, perpetuating silence and inequalities. Corroborating this perspective, Guse, Waise and Esquincalha (2020, p. 23), when investigating the perceptions of mathematics undergraduates, reiterate the importance of these discussions throughout the course, but report that they "are not promoted [...], nor fostered by their trainers" or by those who consider the topic relevant.

Under the protective coating inherited from Cartesian mathematics, i.e. neutrality and self-sufficiency, their studies focus solely on questions of content, without making room for reflections on the possible roles that mathematics plays in society (Skovsmose, 2017). We agree with Skovsmose when he says that mathematics is a divine form of knowledge; however, this does not make the relationship between *mathematics and power* non-existent. Let's realize, based on Frankenstein (1989), that the lack of this clarification, combined with the misuse of mathematical knowledge, can lead to racial, sexual and socioeconomic discrimination. Therefore, the training of this professional requires socially stratified reflections, since their practice deals with human beings loaded with experiences, subjectivities and individualities. Otherwise, it will serve as social machinery that maintains inequalities and asymmetrical power structures.

In this way, it is hoped that the initial training of teachers will take into account the heterogeneous characteristics of schools, encompassing the tangents discussed throughout this paper. In this way, these professionals will be able to "learn to recognize and work with their students who are not part of society's hegemonic pattern, dealing with prejudiced and discriminatory situations in school environments and not being reproducers of these actions" (Guse, Waise and Esquincalha, 2020, p. 23).

In the document we analyzed, we saw potential for this approach in the third core subjects, since they reflect the infamous school ground, i.e. its limits and possibilities. As an example, *UCE3: Projeto Matemática em Dia* focuses on direct interaction with basic schools, promoting practical training through experiences in school environments. In addition, the subject *Reading and producing academic texts* can contribute by making it possible to discuss pedagogical, specific and social problems through bibliographic material, the content of which can serve as a starting point for broader reflections.

Thus, we reiterate the need to pay attention to the complexity of students, considering their subjectivities, identities and individualities. So we ask ourselves: how can we teach mathematics in an equitable way without taking these particularities into account?

6 Final recommendations

The aim of the research in this paper was to examine how issues of diversity and social problems are represented/negotiated in the curriculum of the Mathematics degree course at IFNMG, Salinas campus, in the light of post-critical curriculum theories. The analysis revealed perspectives and challenges in considering power relations, cultural identities and diversity in the educational context, promoting more diverse learning. Although this approach values dealing with these relationships in the teaching and learning process, it does not promote an in-depth reflection typical of post-critical theories, tending, in its structure, towards critical curriculum theory, even though it has traditional characteristics.

However, there are points that require revision. If the aim is to promote inclusive,

equitable and label-free mathematics teaching, it is essential to reflect on how issues of gender, race, class and other diversities permeate the curriculum and classroom practices. This movement must go beyond reviewing curriculum content, including continuing training and conversation circles, preparing undergraduates to deal with these issues in a sensitive and assertive manner. After all, the classroom is a heterogeneous space and cannot be seen as an extension of personal ideologies.

Axiologically, we suggest a thorough review of the curriculum structure, especially in terms of standardization and consistency. As discussed, the lack of uniformity in the reference lists, as well as grammatical and formatting errors, compromises the credibility of the document and could have a negative impact on the perception of the course by the academic community. Another critical point concerns the bibliographic references adopted in some subjects, which in some cases are out of date, canonized and outdated. We suggest incorporating recent research, in many cases funded by public money, such as papers, theses and dissertations, which reflect recent and localized knowledge.

We believe that this analysis contributes to a restructuring of the curriculum, by presenting limitations and possibilities for dealing with issues of diversity. This need is evidenced by the fact that, in 2023, the document was restructured twice, in February and April. It is important to note that we are not arguing that the Mathematics degree course at the IFNMG Salinas campus is disorganized or fragmented, but that its curriculum has gaps that need critical review.

Finally, it is clear that the curriculum does not properly problematize issues of gender, race and sexuality, but only touches on them. Does this silence indicate that doing mathematics is also doing masculinities, as Mendick (2005) suggests?

Conflicts of Interest

The authors declare no conflicts of interest that could influence the results of the study presented in the article.

Data Availability Statement

The data collected and analyzed in the article will be made available upon request to the authors.

Note

The translation of this paper from Portuguese into English was funded by the Minas Gerais State Research Foundation (Fapemig — Fundação de Amparo à Pesquisa do Estado de Minas Gerais), under Call for Proposals 8/2023.

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