

Conceptual aspects of Traditional Classical Pedagogy versus Critical Mathematics Education: spaces of tension

Abstract: Among the various debates present in curriculum studies and Mathematics Education, the controversy (Orlandi, 2020a) about the traditional perspective stands out. To explore this issue, we turn to Herbart (1946, 2014) to establish connections between the traditional approach and Critical Mathematics Education (EMC), as proposed by Skovsmose (2001, 2007). The theoretical and methodological basis adopted is based on Orlandi's Discourse Analysis (2017a, 2017b, 2020a, 2020b). As a result, Herbart emphasizes the concept of interest, widely used today, proposed with a focus on life-oriented education. His approach, structured on the pillars of government, instruction, and discipline, conflicts with inequality and the social responsibility of schools, aspects proposed by EMC.

Keywords: Curriculum Theories. Herbart. Traditional. Critical Mathematics Education.

La herencia conceptual de la Pedagogía Tradicional Clásica frente a la Educación Matemática Crítica: espacios de tensión

Resumen: Entre los debates presentes en los estudios curriculares y en la Educación Matemática, destaca la polémica (Orlandi, 2020a) perspectiva tradicional. Para abordar esta cuestión, se retoman las obras de Herbart (1946, 2014), con el fin de establecer vínculos entre la pedagogía tradicional y la Educación Matemática Crítica (EMC), como proponen Skovsmose (2001, 2007). El estudio se basa en el Análisis del Discurso de Orlandi (2017a, 2017b, 2020a, 2020b), que sustenta el enfoque teórico y metodológico. Entre los hallazgos, se destaca el concepto de interés en Herbart — orientado a una formación para la vida —, aún vigente. Su propuesta, basada en gobierno, instrucción y disciplina, entra en conflicto con la desigualdad y la responsabilidad social promovidas por la EMC.

Palabras clave: Teorías Curriculares. Herbart. Tradicional. Educación Matemática Crítica.

Aspectos conceituais da Pedagogia Tradicional Clássica frente a Educação Matemática Crítica: espaços de tensionamento

Resumo: Entre os diversos debates presentes nos estudos curriculares e na Educação Matemática, destaca-se a polémica (Orlandi, 2020a) sobre a perspectiva tradicional. Para explorar essa questão, recorre-se a Herbart (1946, 2014), com o objetivo de estabelecer conexões entre a abordagem tradicional e a Educação Matemática Crítica (EMC), conforme proposto por Skovsmose (2001, 2007). A base teórica e metodológica adotada fundamenta-se na Análise de Discurso de Orlandi (2017a, 2017b, 2020a, 2020b). Como resultado, ressalta-se, em Herbart, o conceito de interesse, amplamente utilizado atualmente, proposto com foco em uma formação voltada para a vida. Sua abordagem, estruturada nos pilares do governo, da instrução e da disciplina, entra em conflito com a desigualdade e a responsabilidade social da escola, aspectos propostos pela EMC.

Palavras-chave: Teorias Curriculares. Herbart. Tradicional. Educação Matemática Crítica.

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ARTICLE

1 First words

In education, discussions surrounding the traditional approach have been ongoing throughout history, fraught with clashes and friction that, following the school reform movement, have led to the rejection of this perspective. These clashes extend to and are incorporated into Mathematics Education. Charlot (2020) proposes the existence of a *pedagogical impasse*, resulting from the accommodation of traditional pedagogy to the logic of performance and competition, while, at the other extreme, new pedagogy accommodates issues such as creativity, innovation, teamwork, among others.

Silva (1999) associates the traditional approach with the first marks of curriculum theories, positioning these initial conceptions in the idea of *how to* make the curriculum, in a factory dynamic. This approach precedes the critical and post-critical theories that, after the first half of the 20th century, challenged this curricular conception with political and structural questions about its purposes and the place occupied, or not, by society and knowledge.

After more than a century of friction between curricular theories, the traditional conception of curriculum — associated with one of the first curricular systematizations — remains firmly entrenched in school approaches. Filipe, Silva, and Costa (2021) discuss how Tylerian rationality, framed as traditional by Silva (1999), predominated in Brazil until the 1970s, finding current correspondences in the *Base Nacional Comum Curricular* [National Common Curriculum Base — BNCC (Brasil, 2017)]. The BNCC presents a formative ambiguity by supposedly proposing a critical education with social concerns, but in practice, it results in the formation of individualistic, competitive people who maintain the *status quo* — characteristics typical of the traditional perspective.

But, after all, what is the traditional perspective? In other words, thinking about its origin, which author underpins this approach?

A series of references deal with (and not about) this perspective, whether exploring curriculum theories (Silva, 1999), pedagogical trends (Libâneo, 2016), studies on curriculum documents (Filipe, Silva, and Costa, 2021), or even the Critical Mathematics Education — EMC approach (Skovsmose, 2007). However, the mention of the traditional perspective in both cases seems somewhat open, something that is not closed — a kind of theory without a theorist, a reference without a referent. It is a space of tension in discourses that are controversial. On this point, Orlandi (2020a) mentions that controversial discourse is established by a tense relationship, in which speakers dispute meanings between the same and the different.

Concerned by this indeterminacy and recognizing its relevance,

the pedagogical ideas of Comenius, Rousseau, Pestalozzi, and Herbart — in addition to many others we cannot mention here — formed the basis of European pedagogical thinking, spreading throughout the world and defining the pedagogical concepts that are known today as Traditional Pedagogy and Renewed Pedagogy. (Libâneo, 2006, p. 61).

A few years later, around 1960, critical education took shape in response to the movement driven by critical theory (Skovsmose, 2007), highlighting political and social issues that relate to students' relationship between life and school.

Considering this scenario, a revival of Herbart's ideas was proposed, which comprise the first major pedagogical compilation and have the merit of elevating pedagogy to the scientific sphere (Luzuriaga, 1946). Although the authors of traditional theories do not call it that, a return to this classic author is promoted, understanding that he is fundamental for

thinking about the place of traditional teaching in Mathematics Education. In dialogue, EMC is presented to establish possible points of contact, or friction, between these theoretical perspectives.

To this end, this text aims to outline the relationships between the traditional approach and Critical Mathematics Education (EMC) as proposed by Skovsmose (2001, 2007), in order to provide clues that corroborate the contrast between what is fundamentally considered a traditional perspective and EMC. This objective unfolds into the following guiding question: what approaches do Herbart (1946, 2014) and Skovsmose (2001, 2007) configure in their pedagogical conceptions?

In order to carry out this proposal, the theoretical and methodological approach of Discourse Analysis (DA) was used, as presented by Orlandi (2017a, 2017b, 2020a, 2020b). For the author, discourse analysis involves the constitution of a *memory* (Orlandi, 2020a) intrinsic to discourse, establishing interdiscursive aspects that can be defined as “that which speaks before, elsewhere, independently. In other words, it is what we call discursive memory: the discursive knowledge that makes all speech possible and returns in the form of the pre-constructed, [...]” (Orlandi, 2020a, p. 29). In this work, Herbart's proposition was positioned as a discursive memory historically embedded in Brazilian society.

One of the works analyzed is entitled *Antologia de Herbart* (1946), composed of a collection of excerpts gathered and organized by Lorenzo Luzuriaga, a scholar dedicated to the theories of Pestalozzi and Rousseau, direct references of Herbart. This work, originally written in Spanish, was translated by the authors of this paper during the systematization and analysis process.

The second work, entitled *General Pedagogy*, was written directly by Herbart in 1806. A version translated into Portuguese by Ludwig Scheidl, republished in 2014, was used. This work consists of three distinct books: *Book One: The Purpose of Education: General Meaning*; *Book Two: The Multiplicity of Interest*; and *Book Three: The Strength of Moral Character*.

To delve into EMC, we immersed ourselves in Ole Skovsmose, mainly through the books *Critical Mathematics Education: the question of democracy*, from 2001, and *Critical Education: uncertainty, Mathematics, and responsibility*, from 2007.

It should be noted that this paper has no political interest in defending the traditional perspective. It starts from the premise that revisiting this approach can contribute to the field of research in Mathematics Education, in the movement to recognize aspects that have long been avoided and remain largely unknown. Thus, a series of elements considered fundamental to the teaching of Mathematics are compiled. The text is structured into the following sections: *Following the analytical path*; *Context of production*; *The birth of pedagogy as a science*; *Central concepts*; *The non-place of the social* and *Final words*.

2 Following the analytical path

Throughout this investigation, she focuses on two archives. For AD, even though the text is not a flat surface (Orlandi, 2020b), it formulates an archive. This archive stabilizes meanings — “less about what *can be* said and more about what *should be* said” (Orlandi, 2017a, p. 172) — and the author emphasizes that discursive materiality refers to the verbal conditions of existence of objects (scientific, aesthetic, ideological) in a given historical scenario.

The analysis is based on the construction of enunciations that, via metaphor, are understood through word substitution, in practice, “one speaks the same language, but speaks differently” (Orlandi, 2020b, p. 83). At the same time, DA is introduced in this section and extends throughout the research.

This product of analysis results from understanding (and not mere reflection). On this point, Orlandi (2020a) segments the process of interpretive analysis — which reveals non-neutrality — into three stages: intelligibility, interpretation, and understanding.

Intelligibility refers to the meaning of language, with knowledge of the language being sufficient for something to be intelligible.

Interpretation, on the other hand, is linked to the articulation of language in search of the meanings of what has been said or who said it, and is always linked to a specific meaning. Hence the relevance of understanding in the analytical process, as it is what enables the explicitation of other meanings, present or absent, in the face of the non-transparency of language.

The discursive materiality of analysis, according to Orlandi (2020a, 2020b), does not produce a generalized result, that is, there is no single analysis. The author points out that, at the level of representations, units, completeness, coherence, and non-contradiction are formulated — all situated in the realm of the imaginary. Unity (imaginary), in this context, should not be thought of as something whole (or not), but as something that remains open (Orlandi, 2020b). Even though the enunciations have the effect of closure, “meaning is (always) in progress” (Orlandi, 2020b, p. 11).

The limit for the construction of this device is established from the perspective that “language is a system of relations of meaning, where, in principle, all meanings are possible, while at the same time its materiality prevents meaning from being just any meaning” (Orlandi, 2020b, p. 19). This is also where the analyst's non-neutrality lies: it is a choice between several possible meanings — a choice that is fundamentally coherent.

3 Production context

Avoiding an anachronistic analysis, we consider “discursive semantics (discourse theory): that which deals with the historical determination of meaning processes” (Orlandi, 2020b, p. 21). This section presents an initial overview of Herbart's life and some central points that initiate the conversation about his pedagogical propositions, which will be further developed in the following sections. This overview is based on the text organized by Lorenzo Luzuriaga, responsible for compiling the *Antologia de Herbart* (1946), in dialogue with the emergence of EMC. It is considered that, in discourse, “there is historical determination [...]”. The social is not correlative to DA, it is constitutive” (Orlandi, 2020b, p. 27).

Herbart, an only child, was born on May 4, 1776, in Oldenburg (Germany) and was raised with the exclusive dedication of his mother, while his father worked as a justice advisor. In academia, Herbart was initially inspired by Johann Heinrich Pestalozzi (1746-1827), with whom he collaborated on his first publications (Luzuriaga, 1946). While still a child, he received lessons from a private tutor who awakened his interest in philosophical studies. At the age of fourteen, he entered the Humanist Institute in his hometown and, at eighteen, he enrolled at the University of Jena, where he came into conflict with the idealist philosopher Johann Gottlieb Fichte (Luzuriaga, 1946).

After graduating from university at the age of 21, he worked as a private tutor for three children in Bern, Switzerland, which was his greatest pedagogical experience. It was during this period that he established contact with Pestalozzi, whom he visited in Burgdorf in 1799 (Luzuriaga, 1946).

Also in 1799, Herbart returned to Germany, settling in Bremen, where he prepared for a university teaching career. During this period, he produced several works in which he demonstrated his admiration and respect for Pestalozzi's ideas. In 1802, he joined the faculty at

the University of Göttingen, becoming a professor in 1805 (Luzuriaga, 1946).

A year later, in 1806, he published the first of his most significant works, *General Education*, one of the works that will be analyzed in this text.

In 1809, Herbart succeeded Kant in the chair of Philosophy at the University of Königsberg, where he remained until 1833. During this period, he founded a pedagogical seminar with a practical school and a boarding school. His tenure and work contributed greatly to the recognition of pedagogy in the field of philosophy at universities (Luzuriaga, 1946). In this sense, Luzuriaga (1946, p. 9-10) observes that, “for this reason, several figures of classical German thought (Humboldt, Fichte, Kant, Hegel, Herbart) and of our time (Dilthey, Natorp, Paulsen, Spranger) have dealt with educational and pedagogical problems”.

Herbart's pedagogical ideas exerted influence from the second half of the 19th century to the beginning of the 20th century, later conflicting with the idealistic and neo-Kantian pedagogy of Natorp, as well as with the pragmatist thinking of Dewey, which in practice translated into the New School movement (Luzuriaga, 1946).

In this scenario, “Critical Mathematics Education originated during the 1970s in a European environment, and during the 1980s a new version emerged in the United States” (Skovsmose, 2007, p. 20). The author also points out that in Brazil, a strong trend toward EMC developed in 1984, when Ubiratan D'Ambrosio presented his ideas on Ethnomathematics.

One of the impulses that marked the emergence of EMC lies in Theodor Ludwig Wiesengrund-Adorno's work *Education after Auschwitz*, in which the author associates the function of the school institution with its social responsibilities. From this perspective, a new commitment is established for schools — and specifically for Mathematics Education.

Although friction with the escolanovismo movement has obscured discussions around Herbart's pedagogical perspective, one cannot ignore the principle that discourses are not purely unprecedented. It is not possible to completely discard one pedagogical conception in order to implement another, whether by virtue of the notion of paraphrase and interdiscourse, or by understanding that “necessarily determined by its exteriority, all discourse refers to another discourse, present in it by its necessary essence” (Orlandi, 2020b, p. 30).

In other words, approaching the traditional pedagogical conception based on the prerogative of complete rejection — as is typical of the escolanovista movement — makes it impossible to create tension from a historically defined discourse (paraphrase/repetition). In this movement, ignoring or erasing the past hinders the process of thinking, improving, and building alternatives for a better future.

In parallel with this debate, José Ortega y Gasset translated Herbart's work *General Pedagogy*, reaffirming it as the first major essay to structure educational activity under a scientific regime (Luzuriaga, 1946). According to the author, “educational activity differentiates Herbart into three essential moments or functions: government, instruction, and discipline” (Luzuriaga, 1946, p. 12).

In this context, the concept of government is focused on maintaining order — on disciplining bodies and guiding students — keeping them busy and active. To this end, strategies such as love, authority, surveillance, and intimidation are used, the first two being considered by Herbart to be the most effective (Luzuriaga, 1946). Herbart is recognized as one of the first authors to question the use of physical punishment in the educational process — hence the mention of love in the exercise of pedagogical government.

Instruction, as conceived by Herbart, has as its purpose, like all education, the formation of character and morality, driven by the multiplicity of interests that must penetrate the

representations and conceptions of students (Luzuriaga, 1946). Interest, in this sense, is seen as the driving force behind educational action, linking it to the world, to multiplicities, to knowledge, and to predispositions which, although segmented, must be unified in the personality. “Herbart is the creator of this concept of interest so valued by modern education” (Luzuriaga, 1946, p. 13).

Discipline, on the other hand, pursues the formation of virtue in the personal sphere of conduct, combined with an idea of vigilance. It differs from government, which refers more to the external aspect of pedagogical action, while character and the idealization of willpower (moral autonomy) constitute the purpose of discipline (Luzuriaga, 1946).

These three functions — government, instruction, and discipline — articulate a formative process aimed at the moral and ethical constitution of students, aiming at their future insertion in society. In contrast, EMC problematizes this perspective, arguing that “it seems that mathematics education serves a social function of promoting a stratification that can leave marks on students” (Skovsmose, 2007, p. 25). In this case, the relationship with society becomes part of the teaching and learning process as a constitutive dimension of educational practice. Thus, it is possible to summarize the distinction between the two approaches in the following terms:

- I. Enunciation: In the traditional approach, society is seen as an end that comes after the educational process;
- II. Enunciation: In EMC, society is inherent to the teaching and learning process.

Regarding the educational process, Herbart developed the theory of educational stages, which establishes an ideal process for presenting and assimilating the content to be learned (Luzuriaga, 1946). The proposed stages are:

Perception (first exposure, moment of expanding or intensifying knowledge through what is shown); Association (connections with existing representations); Systematization (process of generalization and ordering) and Method (application of what has been learned in reality, in practice) (Luzuriaga, 1946, p. 13).

It should be noted that the association, when dialoguing with existing representations, refers to didactic aspects (method) that are far removed from social issues. In contrast, EMC “cannot be identified with a certain classroom methodology. It cannot be constituted by a specific curriculum” (Skovsmose, 2007, p. 73). For the author, EMC is seen as something that cuts across the teaching process, with reference to a particular context associated with the philosophical conception of critical theories. It is directed towards concerns about inequalities and social justice.

- III. Enunciation: Unlike EMC, traditional pedagogy is a method.

Another equally important aspect of Herbart's pedagogy is manifested in its relationship with life. His pedagogy is markedly individualistic and focused on the formation of citizens who only begin to concern themselves with their relationship with life and society when they reach adulthood, that is, after their school years (Luzuriaga, 1946). Therefore, the reality present in the stages of teaching proposed by Herbart is interpreted as synonymous with practice or reference that drives learning.

The individuality present in Herbart's studies is perhaps the biggest point of friction in relation to Critical Mathematics Education. As Skovsmose (2007, p. 25) states, “it seems that Mathematics Education serves a social function of promoting a stratification that can leave

marks on students.” This stratification, according to the author, stems from ignorance of aspects of students' social, political, and cultural lives. In other words,

IV. Enunciation: Traditional pedagogy is individualistic;

V. Enunciation: Critical Mathematics Education demands social, political, and cultural aspects.

Herbart also defends the autonomy of education from the state, stating that “the state needs education and public education needs various forms of support” (Luzuriaga, 1946, p. 14). This relationship is conceived under the logic of interdependence, in which the school and the State, each with its relative autonomy, “therefore, act in the school as a constant force with results that may favor or disturb the State, but whose nature the State cannot transform” (Luzuriaga, 1946, p.15).

In contrast, EMC observes the role of the state in the constitution of students and its inseparability from the learning process, considering that “the obstacles to learning must be thought of in terms of the historical-cultural past and the real constitution of the person, also considering the opportunities that the real political-social system makes available” (Skovsmose, 2007, p. 47).

The discussions in this section are based on the idea that “the work of the discourse analyst is to show how a symbolic object produces meanings, how the processes of signification work on a text, any text” (Orlandi, 2020b, p. 82). Also driven by metaphor, the following enunciations are formulated:

VI. Enunciation: For EMC, the State is inherent to the teaching and learning process;

VII. Enunciation: For traditional pedagogy, the State is external and immune to change.

Finally, this section highlights Herbart's conception of the relationship between theory and practice in the educational process. For Herbart, science and theory are located in one place, while practice and experience occupy another, but are understood as complementary and necessary spheres in pedagogical practice (Luzuriaga, 1946).

Before delving into the works in the next section, we highlight the way in which the text is structured. It can be observed that, in both writings, the paragraphs are numbered in ascending order, with the count restarting at each new section. As Orlandi (2020b, p. 14) states, “considering its materiality, it can be said that text is not a flat surface [...]. If we look at it from a discursive perspective, text is a *bolide* of meanings”. In other words, the text is conceived as a complex object that produces effects of meaning in its structure, language, form, and content, among other aspects, as suggested by the very definition of discourse.

In addition, the text has a structure that is subject to quantitative organization, possibly in an attempt to be recognized by the positivist sieve, which was strongly predominant at the time. It resembles a manual. Together with the numbering, the text develops in a format very similar to the systematization of topics that are sometimes interrelated.

4 The birthplace of Pedagogy as a science

In rejection of the empirical pedagogical view, linked to practice in the extension of experiences and observations strongly present in his time, Herbart (1946, p. 18) defended the importance of theory, since “in the school of science one learns in order to practice later [...]”.

For the author, only theory teaches us to study the nature of pedagogy in order to break with the routine processes of poor learning promoted exclusively by practice. According to Herbart (1946, p. 19), “of all this, he knows nothing from his experience; he only perceives its relationship with men, the failure of his plans, without discovering the basic error”.

In the developments of this section, it is proposed to “analyze with the utmost care the main particular concepts, namely: multiplicity, interest, character, and morality” (Herbart, 1946, p. 59).

Herbart (1946) defends pedagogy as a science in contrast to art. For him, the pedagogical sphere is part of a philosophical thinking that transcends the empirical relationship of affinities or skills acquired exclusively through personal experience, imposing a necessary discussion between theory and practice.

In conclusion, Herbart (1946) states that there is “a preparation for art through science” (p. 22), in which art is conceived as a set of skills and abilities acquired through practice to achieve a specific end, while science is restricted to the theoretical realm. “But still, only those who have learned to think science can learn art” (Herbart, 1946, p. 23).

The art of teaching depends, above all, “on the teacher's ability to break down the object studied into smaller parts, so as not to leave any gaps unconsciously” (Herbart, 1946, p. 74). This object is based on the principle that “the subject matter of teaching lies in the sciences” (Herbart, 2014, p. 89). Based on these excerpts, we present the first shift in this section, considering that “historicity is represented precisely by the shifts (paraphrases) that install the saying in the game of different discursive formations [...], through the metaphorical effect” (Orlandi, 2020b, p. 83).

I. Sliding: Scientific knowledge as a whole must be broken down into smaller parts for a gradual construction of learning.

In addition to the scientific principle that guides the content to be taught, Herbart (1947) highlights the importance of selecting topics that are considered relevant to students after their school life, that is, in adulthood. By associating educator and learner, “the educator represents the future man alongside the adolescent. Consequently, the goals that the learner will set for himself in the future as an adult are now the goals that the educator must set for his own efforts” (Herbart, 2014, p. 46).

This aspect leads to an essential parameter for understanding the author's conception of school knowledge: it is a fragmented body of knowledge, in which the object of teaching is divided into parts that, throughout the process, enable its complete and integrated understanding.

This relevant content is linked to the student's preparation for adult life, particularly in relation to their performance in the world of work and the qualification of the workforce. Since EMC is not linked to a specific teaching method, it can be promoted through content broken down into smaller parts; however, it lacks the inclusion of social issues, so that “for education, both as practice and as research, to be critical, it must be aware of social problems, inequalities [...] and must try to make education a progressively active social force” (Skovsmose, 2001, p. 101).

In line with this perspective, Skovsmose (2007, p. 27) questions the fact that the “mathematics education community shows ignorance of aspects of the social, political, and cultural life of students”. These two approaches are woven together in the following construction:

II. Enunciation: EMC can be promoted through the organization of knowledge present in traditional pedagogy, provided that social factors are considered and it is motivated by a progressively active social force.

It is evident that the association between social life and the educational process, as pointed out by EMC, leads to the emergence of a type of knowledge not contemplated by

Herbart. In other words, there is a need to include knowledge that goes beyond strict scientific knowledge and the official part of curriculum documents. For Herbart (1947), mastery of science does not guarantee the infallible success of art, but it constitutes prior knowledge that amplifies understanding and practical skills, which are progressively improved through mistakes.

His view of teacher training is noteworthy. Although he does not emphasize the need for continuous theoretical training, Herbart recognizes the constant development of teachers throughout their professional careers. This discourse resonates strongly today, shaping a process that “must guide the educator toward the constant image of a pure young soul that develops vigorously and at an ever-increasing pace [...]” (Herbart, 1946, p. 23).

III. Enunciation: Traditional theory demands a science that initially prepares teachers for the practical field, which subsequently develops incessantly.

When entering the theoretical dimension, it can be observed that “pedagogy, as a science, depends on Practical Philosophy and Psychology” (Herbart, 1947, p. 26). Practical Philosophy is based on virtue as the totality of the pedagogical end, promoting the development of a permanent reality and inner freedom (Herbart, 1946). This inner freedom is linked to discernment (*Einsicht*) and willpower, while permanent reality is focused on morality itself (Herbart, 1947).

Psychology, in turn, focuses on recognizing the aptitudes¹ that gradually manifest themselves in people from childhood, establishing characteristics that favor or limit learning. These predispositions can be perceived by the degree of curiosity and questioning exhibited by the child (Herbart, 1946).

This view of psychology understands instruction as a systematization of already acquired knowledge (*masses of representations*), which interact and influence the apprehension of new knowledge. In addition, it considers the speed with which learning takes place and whether or not it is retained in students' memory (Herbart, 1946).

The process of identifying students' aptitudes is based on a set of speculations that gradually reveal “whether education is feasible or not” (Herbart, 1946, p. 53). Thus, for the author:

IV. Enunciation: learning everything is not for everyone.

The demarcation of aptitudes that shapes the recognition of students' abilities and limitations occurs even in informal situations, such as

during break time: whether students use all the objects presented to them, even if it is a game, in a completely useless way; or whether they intentionally modify them in various ways on a whim; or whether certain objects are chosen with a consistent preference (Herbart, 1946, p. 51).

V. Enunciation: The pedagogical proposition operates under the idea of skills that create specificities (individuality) for each student in the form of recognition of abilities, predispositions, and limitations directed toward a socially desired virtue.

The individual capacity of each student is placed under the concept of “educability (*Bildsamkeit*)” (Herbart, 1946, p. 25). This broad concept involves notions of ductility and

¹ The expression derives from the Latin *mens sana in corpore sano*, which originated with the Roman poet Juvenal around the second century AD, and its literal translation means *a healthy mind in a healthy body*. The phrase emphasizes the relationship between physical and mental health, promoting an essential balance that, throughout history, has influenced both the fight against physical punishment in the educational environment and the appreciation of physical exercise.

plasticity which, anchored in physics, explore the capacity of an object to be deformed without presenting breaks, cracks, or other signs that indicate the limits of a given depth.

An offshoot of this view of aptitude and educability clashes with the process of exclusion of many students. For Skovsmose (2007, p. 36), “consequently, traditional mathematics teaching, including its commands, appears to be a failure, notably for a large number of ‘normal’ students”.

Thus, the concept of failure takes on two distinct interpretations:

- VI. Enunciation: according to traditional theory, failure is understood as a lack of aptitude or inability to be educated on the part of the student;
- VII. Enunciation: according to EMC, failure is understood as a failure of the teaching and learning process, which stratifies students.

The traditional perspective tends to naturalize the goals achieved by students at the end of the educational process, while EMC questions the determination promoted by this training. “Thus, elementary mathematics education may also exclude a group of ‘disposable people’ who should be satisfied with any type of work they are given” (Skovsmose, 2007, p. 38). In the case of the exclusion of certain students, the fault is projected onto the school, the educator, and others involved in the educational process.

5 Key concepts

While EMC focuses mainly on the purposes of the educational process, that is, *what* and *why* certain content is studied, Herbart's perspective (1946) is strongly linked to the teaching method, that is, the way *in which* certain content is taught. He emphasizes the relevance of the theoretical space and the various references that help build methodological paths to be followed.

For Herbart, the absence of these references encourages teachers to follow the same paths, without realizing the various possibilities that can be explored. This perspective on education implicitly favors teaching over learning.

For Herbart (1946, p. 22), teacher training should enable teachers to “grasp, *understand*, *perceive*, and *judge* the phenomena that await them and the situation in which they find themselves” (Herbart, 1946, p. 22, translation and emphasis added). The verbs highlighted refer exclusively to the school environment, isolated from any social relations. For the author, theoretical consolidation is relevant in the process of expanding teachers' methodological repertoires.

- I. Enunciation: Traditional pedagogy does not encompass social aspects.
- II. Enunciation: Traditional teaching requires method.

In contrast, the theoretical approach of EMC is concerned with the way in which:

Mathematics intervenes in reality by creating a “second nature” around us, offering not only descriptions of phenomena, but also models for changing behavior. We not only ‘see’ according to mathematics, we also “act” according to it. (Skovsmose, 2001, p. 83).

The author also questions the ideology of certainty that permeates mathematics teaching, expressed in enunciations such as “numbers speak” or “the data proves,” projecting a virtual reality (Skovsmose, 2007) in which numbers present an illusory guaranteed reliability.

The traditional method advocates an education free of physical punishment to deal with

pedagogical problems, a phenomenon characteristic of its time. Furthermore, Herbart (1947, p. 79) points out that “being boring is the worst sin in teaching”. Therefore, even from a traditional perspective, the adoption of monotonous and extensive methods, such as solving long lists of exercises or copying extensive texts, is not desirable.

For the author, if the student's education is not based on inner freedom and discernment, “there is a risk that the student will subordinate his conscience to aesthetic judgment — when he does this, he has a vulgar opinion; hence arises evil itself” (Herbart, 1946, p. 29). Thus, we arrive at a new educational frontier related to interest, limiting the student's freedom in aspects consistent with the knowledge to be cultivated.

On the other hand, for Skovsmose (2007), when teaching is established in a critical manner, it demands a reaction to social contradictions, becoming an instrument linked to human rights and divergent from the perpetuation of cultural and social catastrophes.

III. Enunciation: The traditional approach, by ignoring social inequalities, normalizes them.

IV. Enunciation: EMC focuses on social issues, aiming to address inequalities and improve human rights.

When it comes to the relationship between teacher and student, Herbart (1946) assigns a series of prerogatives to the teacher, emphasizing their training and performance. Meanwhile, the specificities directed at students remain constantly implied or appear only as implications derived from the guidelines intended for teachers, relegating the student to the background.

Furthermore, Herbart observes that signs can become an obstacle to the teaching process if they are not overcome by the student's genuine interest, which makes language learning a significant challenge, regardless of the language involved (Herbart, 1947). This idea also stems from the author's understanding that teaching must fulfill two fundamental objectives: “it must provide the elements and organize their interconnections. Organize them, but not carry them out, because their realization is infinite” (Herbart, 2014, p. 102).

In the teaching process, Herbart (1947) points to the need for knowledge connected with historical (chronological) experience with a view to effectively building the student's systematization of knowledge. The historical dimension is considered relevant, “because the mission of the educator is an uninterrupted function which, considering all variables, must always unite the past with the future” (Herbart, 1946, p. 28).

Every movement of connections that is prioritized in the educational process is permeated by the principle that “individuality must be kept intact, whenever possible” (Herbart, 1946, p. 56). At this point, one of the most criticized ideas (in the sense of critical analysis) of his pedagogy can be identified: the idea that “the learner is an individual person” (Herbart, 2014, p. 50). This conception contrasts sharply with several current views in sociology and critical theory.

For Skovsmose (2001, 2007), education is directly associated with collective aspects, in which “mathematical structures come to play a role in social life that is as fundamental as that of ideological structures in the organization of reality” (Skovsmose, 2001, p. 83).

These social factors are also reflected in the difficulties encountered by students during the learning process. From this perspective, “learning obstacles should not only be sought in a person's historical and cultural background, but also in the actual social constitution of the person, as well as in the opportunities that the actual political and social system makes available to them” (Skovsmose, 2007, p. 47).

In other words,

V. Enunciation: From a traditional perspective, individuality, supported by aptitude, is

fundamental to the teaching and learning process;

VI. Enunciation: In EMC, social, historical, and cultural aspects are fundamental to the educational process, including the formulation of difficulties presented by students.

At the intersection of interest and individuality, Herbart (1947) highlights the importance of discipline that interferes with free will and discernment as a central axis for alignment with morality. In his relationship with psychology, he observes that “individuality is unconscious” (Herbart, 1946, p. 60).

By defining goals, nurturing and prioritizing these interests become the objective of instruction, and it is at this point that educational cultivation resides (Herbart, 2014).

Observing the period of time students spend in the school environment, Herbart (1947) distinguishes between occupation and instruction, emphasizing that not every occupation is an instructional process. In this classification, instruction and discipline are concerned with the future, while government — understood as the organization of time for students to occupy themselves — is dedicated to the present.

In the organization of school time, government encompasses all activities directed at students, and only a portion of these occupations actually correspond to instruction (Herbart, 1947). This is because, according to the author, “children must always be occupied because idleness leads to disorder and savagery” (Herbart, 2014, p. 67).

The government's approach intrinsically seeks to impose order on students, since “an education that does not deal with the disorder of children would not *know* the children themselves” (Herbart, 2014, p. 30). This disciplining of the body, unlike the idea of interest and aptitude, is based on the principle that “children come into the world devoid of will and, consequently, incapable of any moral relationship” (Herbart, 2014, p. 30). For the author, this will is shaped over time and must be directed toward the social good.

VII. Enunciation: pedagogy demands the disciplining of the body and scientific knowledge.

Before delving into the concept of interest, it is important to highlight the polysemy attributed to the term by the author. Polysemy can be understood through its counterpoint: while paraphrase represents repetition, permanence, and the echoing of an already established discourse, polysemy, in turn, represents the new, the rupture, and the projection of new meanings onto a given discourse (Orlandi, 2020a, 2020b).

This leads to the assertion that paraphrase is the matrix of meaning, since there is no meaning without repetition, without support in discursive knowledge, and polysemy is the source of language, since it is the very condition of existence of discourses, because if meanings — and subjects — were not multiple, could not be other, there would be no need to say anything. *Polysemy is precisely the simultaneity of distinct movements of meaning in the same symbolic object* (Orlandi, 2020a, p. 36, emphasis added).

Focusing on interest as a symbolic object, it focuses on highlighting the polysemies that permeate this concept, which is widely present in contemporary educational discourse.

Herbart (1946) values what he calls *immediate interest*, linking this concept to a spontaneous activity that broadens its educability — directed at the content to be studied — thereby expanding the construction and cultivation of learning. These interests are formulated on multiple fronts that must be gradually built up throughout the educational process.

Although the author has sexist ideas when attributing the role of care to the mother and

responsibility for control and order to the father, under the argument of naturalization, when analyzing learning at the intersection of gender, individuality, and multiple interests, it is observed that “the multiple has no sex, no social class, no era. [...] it accommodates men, girls, boys, and women equally” (Herbart, 1946, p. 62).

6 The non-place of the social

To address the relationship between school and society, we start with the expression “*Non scholae, sed vitae discendum!*” (Herbart, 2014, p. 137), which translates as: One must learn *for* life and not for school! The author accompanies this enunciation with a discussion of the concepts of school and life. Based on Herbart's understanding (1947, 2014), this section begins with a reflection on the author's view: after all, what does he mean by *life* and *school*?

The understanding of life is determined by the persistence of interests over the years, and the role of teaching is to prepare students for multiple interests. This movement occurs strongly through observation and sympathy, both regulated by speculation, which keeps them moderate and sustains relevant observation (Herbart, 2014, p. 138). In short, it advocates education *for* life, not *with* life. “Speculation and taste [...]. *They are the anchor of consciousness and personality*; in turn, observation, and with it sympathy, always give themselves over to new *deepening*” (Herbart, 2014, p. 138).

Herbart positions empiricism as the result of simple observation. However, he highlights another form of observation, capable of enabling the aforementioned deepening, affiliated with the idea of the new and discovery and fitting into an intellectual dimension of *general consciousness* (Herbart, 2014, p. 140).

As a counterpoint, the author considers religiosity essential, stating that “*everyone needs religion for intellectual rest*” (Herbart, 2014, p. 138). This place of the intellectual with “all insights must come together in consciousness — *and life, always renewed, must create the school anew*” (Herbart, 2014, p. 141).

This way:

- I. Enunciation: School is formed by the deepening of life, driven by observation and sympathy.

This utilitarian view of life differs from the formulation of critical thinking inherent in EMC. On this point, Rezende and Silva-Salse (2021) emphasize that the development of critical thinking occurs through the criticality of individuals, making it necessary to bring out their ability to analyze their coherence, reasoning, interests, and values in the search for solutions to everyday conflicts or crises.

In other words, for EMC, even if critical thinking is linked to individuality, it remains directly linked to social issues.

- II. Enunciation: According to traditional theory, society creates schools that prepare individuals *for* life.
- III. Enunciation: According to EMC, society is linked *to the* school, since individuality is developed through critical thinking, enabling the resolution of problems that involve the community.

Finally, we arrive at the definitions themselves: “*School means leisure*, and leisure is a common good of speculation, taste, and religion. Life is the surrender of the participating observer to external change and suffering.” (Herbart, 2014, p. 141).

Observing school as leisure leads to a space of permanence and inaction, disconnecting the idea of research from the educational process. Meanwhile, life appears as a possible

facilitating reference for teaching already established and recognized knowledge.

This characterization is “so dear to the historical form of the capitalist subject: free and responsible” (Orlandi, 2017b, p. 16). Orlandi (2017b) further emphasizes that this notion of freedom disregards the fact that it is inseparable from the concrete conditions of the subject, always being in a dialectical relationship between subjectivity and history.

In dialogue with EMC, Petry *et al.* (2020) highlight that traditional, content-based methodology does not meet current social needs, demonstrating its inadequacy in the face of democratic prerogatives. The authors also emphasize the importance of educating participatory individuals who are capable of understanding their role in society, in a school that is attentive to identifying and combating anti-democratic values, such as “the superiority of one social group over another, disregarding the need to respect the different characteristics that people have, such as social class, age, religion, gender, sexual orientation, ethnicity, among other aspects” (Petry *et al.*, 2020, p. 16).

- IV. Enunciation: Traditional theory limits the parameters of social improvement, while EMC focuses on democratic principles in the formation of participatory and influential individuals, promoting dialogue and awareness about social inequalities.

Although EMC does not rely on an exclusive method, Petry *et al.* (2020, p. 4) point out that “in practice, this occurs by providing an environment in which students are encouraged to research, seek strategies, and find solutions to a problem situation that makes sense to them”.

- V. Enunciation: While the traditional approach focuses on the student and investigates *about* their interests, EMC positions research *for* and *with* the student, promoting a bridge between school content and their social reality.

When it comes to student education, this is subject to a limitation, according to which “pedagogy, however, should not assume any unlimited educability” (Herbart, 1946, p. 26). For the author, the educational process is limited by the situation and time, so that the constitution of an adult develops internally and beyond the reach of the teacher.

With regard to access to school, education is seen as a right for all, regardless of social class, “in order to be useful to the whole of society” (Herbart, 1946, p. 30-31). The usefulness of education, in the author's view, is associated with the idea of the functionality of adults in the world of work. This is still a vibrant element in conceptions of citizenship, after all, “in today's society, the notion of citizenship is linked to that of consumer, and knowledge is related to employment, bringing together the market and work (Orlandi, 2017b, p. 238).

Orlandi (2017b) adds that this framework of citizenship and knowledge does not place pressure on education as a structure to be transformed, prioritizing training and skills development over education.

In contrast, EMC focuses on the social utility of educating critical citizens who are attentive to social inequalities, including those present in the world of work itself.

- VI. Enunciation: While the traditional approach aims at training for the job market, EMC advocates awareness of social contradictions and inequalities.

In Herbart's approach (1946), the experience that is part of students' lives does not concern critical social aspects; on the contrary, it is presented through examples that are similar to or connected with familiar and routine situations in students' lives. Sometimes, this approach may require the articulation of different areas of knowledge in order to be viable (Herbart, 1947). For example,

even the most fundamental mathematical instruction is, in effect, anti-

pedagogical, forming only a separate mass of representations, with which it acquires little influence on the personal value of man, or even more frequently falls into rapid oblivion (Herbart, 1946, p. 42).

VII. Sliding: Teaching requires individual connections with experiences that are not problematic and chronologically determined, which strengthen the retention of the knowledge covered.

Articulating students' experiences with the school environment presents a problem, since “unfortunately, education does not have experience and social interaction at its disposal!” (Herbart, 2014, p. 77). In this case, the author recognizes that experience and social interaction belong to the routine outside school — over which the educator has no control — and can impose various limitations derived from the conditions and social repertoire experienced by the student.

This supposed limitation encourages social maintenance, criticized by EMC, which argues that students' experience and social interaction are fundamental to the teaching and learning process.

Regarding the relationship between school and life, Herbart (1946, p. 100) argues that “one cannot exalt school at the expense of life.” For the author, school educates students so that they can later connect objectively with their lives, immersed in an opposing duality: “the man of the school and the man of the world are completely separate personalities [...]” (Herbart, 1946, p. 100).

By stitching together the place of education with the elements presented, the following construction emerges:

VIII. Enunciation: in traditional education, school prepares students for adult life, while adult life is shaped by society with a focus on work;

IX. Enunciation: at EMC, workforce training is decentralized in order to address social injustices.

When observing the configuration of the State, “according to its nature, everything is subordinate to it. The power in which it acts is recognized in the State, and the portion of power exercised by it is recognized in the man of the State” (Herbart, 1946, p. 101). In this conception, the school institution is also seen as a space subordinate to the State, hindering changes that directly challenge the current system. “For this reason, the school acts as a constant force, in which its results can be used to maintain or disrupt the State, but its nature cannot be transformed” (Herbart, 1946, p. 104).

Combining and merging considerations about life, the state, and school, the following excerpts are formulated:

X. Enunciation: from a traditional perspective, the state influences schools, schools influence education for adult life, and adult life influences the maintenance of the state;

XI. Enunciation: for EMC, the term maintenance is highly undesirable.

7 Last words

Starting from the general objective of stating the relationships between the traditional approach and Critical Mathematics Education (EMC) according to Skovsmose (2001, 2007), in order to provide evidence of the fundamental contrast between these perspectives.

Among the points raised, the construction of a traditional approach based on Practical

Philosophy and Psychology stands out. Even though it was driven by Herbart's experience with three children, this approach culminated in the formulation of an educational model widely adopted for mass education.

The importance of this theorist is marked by the impetus given to pedagogical debates, formulating a device based on government, instruction, and discipline, attentive to the disciplining of the body and the relationship of students with their future lives.

In addition, the author also introduces the concept of *interest* adopted in the educational environment, a topic widely discussed today, linking the multiplicity of interests to the way in which this factor can drive the process of educability, provided that it is associated with the content to be studied. Interest, therefore, is mobilized for an education *for* life and not *with* life.

The individuality and exclusion of social aspects promoted by Herbart create friction when superimposed on EMC, which prioritizes society as a fundamental element. For EMC, society must be considered both in the definition of the objects to be studied by students and as a marker that highlights the historical and cultural difficulties in the education of students.

The projection of Herbart's theory moves Pedagogy to a scientific space that recognizes the importance of the relationship between theory and practice, even though it treats these two factors in isolation, in the dynamic between science and art.

Individuality, possibly the main weakness of Herbart's theory, diverges from curriculum theories developed after the traditional perspective. However, it finds conformity when considering the predominance of neoliberalism today. The aptitude parameter proposed in the traditional approach naturalizes social inequalities and fosters the maintenance of the status quo so criticized by EMC.

This research briefly provides insights to situate the traditional perspective in a space that theoretically grounds it in opposition to EMC. The limits of this research are mainly established by the exclusive scope of two texts by Herbart, which can be expanded by other works by the author and by the exploration of other theorists, such as Franklin Bobbit and Ralph Tyler. Additionally, further analysis can be made in the contrast between the traditional method and Ethnomathematics, one of the cradles of EMC as a method, proposed by Ubiratan D'Ambrosio.

Conflicts of Interest

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

Data Availability Statement

This article was developed based on a theoretical study; therefore, there are no data available.

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