RCMOS – Multidisciplinary Scientific Journal The Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Year V, v.2 2025 | Submission: 08/11/2025 | Accepted: 10/11/2025 | Publication: 12/11/2025

The Implementation of Learning Pathways in the New High School Curriculum: The Perspective of Mathematics Teachers in a Full-Time School in the Amazon

The Implementation of Formative Itineraries in the New High School: The Perspective Of Mathematics Teachers a Full-Time School in the Amazon

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Summary

This article analyzes the implementation process of the Learning Pathways (LP), established by the reform of the New High School curriculum, from the perspective of mathematics teachers. The research investigates the advances and setbacks of this implementation in a full-time school in Manaus/AM, during the period of 2022-2023. The study begins with questioning the difficulties and possibilities encountered by mathematics teachers in this new scenario. A qualitative methodology is used, with an exploratory-descriptive approach, centered on the dynamic subject-object relationship. Data were collected through bibliographic review, document analysis, and the application of questionnaires to twelve teachers from the aforementioned institution. The results indicate that, although the reform aims to deepen knowledge and connect the school to the reality of the students, its application has been problematic. The need for more effective continuing education for teachers is evident, as is the difficulty in reconciling the reduced teaching hours of core subjects with the new demands of the LP, and a mismatch between the objectives of the reform and the structural conditions of the schools and student engagement.

Keywords: Educational Pathways. New High School Curriculum. Mathematics Education. Educational Reform. Amazonian Context.

Abstract

This article analyzes the implementation process of the Formative Pathways (FP), established by the reform of the New High School, from the perspective of mathematics teachers. The research investigates the progress and setbacks of this implementation in a full-time school in Manaus/AM, in the period of 2022-2023. The study starts from questioning the difficulties and possibilities encountered by mathematics teachers in this new scenario. A qualitative methodology is used, with an exploratory-descriptive approach, centered on the dynamic subject-object relationship. Data were collected through bibliographic review, document analysis, and the application of questionnaires to twelve teachers from the aforementioned institution. The results indicate that, although the reform aims to deepen knowledge and connect the school to the reality of the students, its application has been problematic. The need for more effective continuing education for teachers is evident, as is the difficulty in reconciling the reduced workload of the core subjects with the new demands of the FP, and a mismatch between the objectives of the reform and the structural conditions of the schools and student engagement.

Keywords: Educational Pathways. New High School Curriculum. Mathematics Education. Educational Reform. Amazonian Context.

1 INTRODUCTION

The reform of secondary education, instituted by Law No. 13.415/2017, promoted changes.

Structural changes in the curriculum at this stage, seeking to modernize teaching, reduce dropout rates, and bring the...

The school reflects the students' interests. This reform articulated the National Common Curriculum Base.

(BNCC) to the creation of Formative Itineraries, which propose personalized paths of

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learning and are based on pillars such as scientific investigation, creative processes, sociocultural intervention and entrepreneurship. However, the implementation of this proposal has faced significant challenges, especially in the public network, where the lack of infrastructure, the Insufficient teacher training and curriculum fragmentation hinder its effectiveness. In the Amazon, These challenges are intensified by specific geographical, cultural, and material conditions. demanding adjustments that go beyond general guidelines. In mathematics education, the reform This creates tensions between the need to guarantee essential content and the requirement for specific practices. interdisciplinary and contextualized approaches, often lacking adequate institutional support. Thus, Understanding teachers' perceptions becomes fundamental to evaluating the effectiveness of the policy.

This article analyzes the experience of twelve mathematics teachers from a public school. full-time work in Manaus, from 2022 to 2023, seeking to identify the impacts of Implementation of the Training Itineraries, the challenges faced and the strategies adopted. By valuing the voice of teachers, the study contributes to the debate on the relevance and adaptation of Educational policies in relation to regional realities. The article is organized into theoretical framework, methodology, analysis of results and final considerations.

2. THEORETICAL FOUNDATION

The reform of secondary education, instituted in Brazil by Law No. 13.415/2017 and consolidated by The National Curriculum Guidelines for High School (DCNEM/2018) represent a dividing line. Waters in the curricular and pedagogical organization of this level of education. The new model, which seeks a Greater curricular flexibility and the promotion of student leadership led to the introduction of Itineraries. Formative aspects are its central focus, reconfiguring the traditional and homogeneous structure of Education. Medium for an architecture more adaptable to the interests and life plans of students (BRAZIL, 2017; BRAZIL, 2018a). This section explores the theoretical foundations that underpin the analysis of the process of implementing the Training Itineraries, encompassing an understanding of the reform, the Mathematics education, teacher training and practice, and the particularities of the Amazonian context.

2.1 The New High School Curriculum and the Learning Pathways: Between Proposal and Reality

Law No. 13.415/2017 emerges from a complex debate about the need to modernize the Brazilian high school education, which for decades has been criticized for its encyclopedic nature, Out of context and unattractive to young people. The school dropout rate and the low Performance in large-scale assessments, such as the ENEM, signaled the urgency of change. structural (BRAZIL, 2016). The reform, therefore, proposes a flexible curriculum divided into two Parts: the Basic General Education (FGB), common to all students and aligned with the National Curriculum. Common Core Curriculum (BNCC), and the Learning Pathways (IF), which allow students to delve deeper into

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in one or more areas of knowledge or in technical and professional training.

The concept of Learning Pathways is based on the idea that education should go beyond from the transmission of content, preparing the individual for the challenges of a constantly changing world. change, as pointed out by education theorists who advocate for personalization and autonomy. in learning. Moran (2015) argues that the contemporary school should be a space of Innovation, where active and collaborative methodologies replace rigid practices. For him, the Educational pathways represent fertile ground for the integration of knowledge and for promotion. contextualized learning, insofar as it allows the student to choose paths that make sense in your personal and professional journey. This perspective highlights the importance of a A curriculum that not only conveys information, but also develops life skills. Combining theory and practice.

The Training Itineraries, according to the National Curriculum Guidelines for Secondary Education (BRAZIL, 2018a), are structured around four axes:

1. **Scientific Investigation:** Focus on the development of scientific thinking, curiosity, and ability to formulate and test hypotheses.
2. **Creative Processes:** Encouraging innovation, artistic and cultural production, and problem-solving in a creative way. inventive.
3. **Mediation and Sociocultural Intervention:** Preparation to work on social causes, promote dialogue and... Intervention in community problems.
4. **Entrepreneurship:** Developing skills to identify opportunities, plan, and execute. projects, whether in the personal, social or professional sphere.

Despite its innovative proposal, the implementation of the Training Itineraries has generated... significant debates and criticisms. Authors such as Freitas (2018) and Cunha (2017) question whether the The reform, in its practical application, truly succeeds in promoting equity and quality of life. Education for all students. Freitas (2018) argues that the reform, in its essence, can to be seen as a reflection of a neoliberal agenda that aims to undermine public education and directing education towards the demands of the job market, to the detriment of a more comprehensive education. broad and humanistic. This critique points to a possible tension between the official discourse of "Protagonism" and "life project" and the reality of schools with deficient infrastructure, lack of Teaching materials and a lack of adequate training for teachers.

Regarding the dichotomy between idealization and execution, Sacristán (2000) reminds us that the Curriculum is a battlefield where different forces and interests vie for hegemony. The introduction of Learning Itineraries, while potentially paving the way for greater customization, It also risks deepening inequalities if the necessary material and educational conditions are not met. that guarantee diverse and high-quality offerings for all. In vulnerable contexts, the "choice" The itinerary may be limited by a scarcity of options or a lack of information, leading to...

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paths that further undermine the education of students.

Furthermore, the reduction in the teaching hours of the Basic General Education subjects to give The space given to Training Itineraries is another point of controversy. Critics point out that this This decrease could compromise the essential knowledge base needed to access higher education. and for the development of full citizenship (CUNHA, 2017). For a comprehensive education, it is It is crucial that students have access to a solid foundation of knowledge, while at the same time... that develop skills and competencies in areas of interest. The pursuit of this balance makes- if one of the biggest challenges of the reform.

2.2 Mathematics in the New High School Curriculum: Challenges and Reinvention of Teaching Practice

In this context, the contributions of Ubiratan D'Ambrosio (2005) become particularly relevant. relevant. For the author, the teaching of mathematics should be understood as a cultural practice, and the relevance of contextualization is corroborated by Pires (2002), who emphasizes that the construction of The meaning of learning mathematics intrinsically depends on the teacher's mediation. According to the author, the teacher should encourage the intellectual autonomy and critical thinking skills of the students. students, creating bridges between formal mathematical knowledge and the experiential world of students. Instead of teaching focused on the reproduction of techniques, Pires advocates an approach that value the understanding of concepts, the resolution of open-ended problems, and the development of logical-mathematical thinking in an active and investigative way. This mediation, in the context of The concept of "Training Pathways" gains even more importance, as it requires teachers to be able to integrate... Mathematics is linked to other areas of knowledge, promoting interdisciplinarity and... transdisciplinarity.

The BNCC (National Common Core Curriculum) for Mathematics in High School is structured around four major areas of knowledge – Numbers and Algebra, Geometry, Quantities and Measures, Probability and... Statistics – but it emphasizes the development of five general mathematical competencies:

1. **Understand and use mathematical languages** to describe and analyze information, solve problems. problems and making decisions.
2. **Solve problems** using mathematical models of different natures (geometric, algebraic, statistical, probabilistic).
3. **Analyzing and interpreting statistical data** involves information presented in different languages and representations (tables, graphs, texts).
4. **Use technological tools** (calculators, software, applications) to explore, analyze, and communicate mathematical results.
5. **Communicate mathematical ideas** clearly and precisely, using different languages (oral, written, visual).

However, the challenge for the mathematics teacher in the new high school curriculum is even greater. The reduction in the teaching hours of Basic General Training – which, as evidenced in the results of The article, however, has been a point of difficulty for 91.6% of teachers – it creates a significant dilemma.

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How to cover the essential course content (75% of teachers indicated this).
(difficulty) and, at the same time, dedicate oneself to the new demands of the Training Itineraries? This
tension between the depth of disciplinary knowledge and the breadth of contextualization and
Interdisciplinarity demands a reinvention of teaching practice. The teacher often needs to...
to work in multidisciplinary components, such as "Life Project", integrating Mathematics into these.
new contexts, which demands not only flexibility, but also specific preparation that
It is not always offered.

The inclusion of Mathematics in Educational Pathways also implies an approach
with the world of work and with the life plans of students. This may involve
development of projects that use mathematical concepts to solve real-world problems
community, financial data analysis, modeling of natural or social phenomena, among others.
others. This approach, while potentially more motivating for students, requires that the
Mathematics teachers should develop new pedagogical skills and be open to exploring topics that were not
traditionally part of the subject's curriculum (ALARCÃO, 2011).

In short, the transition to the New High School curriculum imposes on the mathematics teacher the task...
to reinterpret his role. He goes from being a transmitter of content to a mediator of
Knowledge is a facilitator of meaningful learning and an integrator of knowledge. This
Reinvention requires not only mastery of the discipline, but also pedagogical flexibility and openness.
to interdisciplinarity and a deep understanding of the reality and interests of their students, something
which is amplified in the complex Amazonian context.

2.3 Teacher Training and Pedagogical Practice in the Context of the Reform

The success of any educational reform ultimately depends on the capacity and
the engagement of teachers in translating policy guidelines into effective pedagogical practices
in the classroom. In the case of the New High School and the Learning Pathways, this premise becomes
This is even more evident given the proposal for curricular flexibility and the demand for different approaches.
Innovative. Teacher training, both initial and ongoing, therefore emerges as a pillar.
irreplaceable for achieving the objectives of the reform.

Maurice Tardif (2002), in his seminal work, argues that the teacher's knowledge is not
They are not only academic or theoretical in nature, but are also built into daily practice and in
specific contexts in which they operate. Experiential, disciplinary, curricular and knowledge
Professional roles intertwine in the formation of teacher identity and in the way the teacher deals with...
with the challenges of the classroom. In order for the Learning Pathways to achieve their objectives, it is
It is essential that teachers are equipped not only with knowledge about the new structure.
curricular, but mainly innovative methodologies and pedagogical strategies that...

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allow them to adapt and apply the guidelines to the reality of their schools and their students. This requires
Ongoing education that goes beyond one-off courses, promoting development.
Continuous professional development and critical reflection on practice.

The Brazilian scenario, however, reveals a significant gap in this regard. According to
As indicated by the preliminary results of this study, the majority of mathematics teachers
(indicated in Question 4 of Questionnaire 01 and reinforced in the open-ended responses) does not feel
adequately prepared to operate in the new model. Training sessions, when they occur, are
often perceived as superficial, decontextualized from local reality and, at times,
external to the universe of teachers, taught by companies from outside the state, as reported by a
Professor. This disconnect between the training offered and the real needs of teachers on the ground.
The challenges of school generate a feeling of confusion and isolation when it comes to the task of innovating.

José Carlos Libâneo (2012) reinforces the idea that the school needs to assume its social role,
democratizing access to scientific and technological knowledge, but without losing sight of the
valuing local cultures. For the author, pedagogical practice should be intentional, planned and
systematically organized, aiming at the comprehensive education of the student. In the context of the reform, this
This means that the curricular flexibility of the Learning Pathways cannot be synonymous with
improvisation or lack of direction. On the contrary, it demands from teachers a
even greater capacity for planning, content and methodological selection, and evaluation.
Consistent with the new objectives, pedagogical and institutional support becomes crucial for this.
The transition should not overburden teachers and should not compromise the quality of education.

Valuing teachers' knowledge and investing in contextualized continuing education.
These are essential elements. Marcelo (2009) highlights that the professional development of teachers
It occurs most effectively when it is anchored in the needs of the practice, promoting the
Reflection, collaboration, and the collective construction of knowledge. An education that does not engage in dialogue.
Given the daily experiences and challenges faced by teachers, change is unlikely to occur.
significant in pedagogical practice. In the context of the Learning Pathways, this implies that
to empower teachers to:

- **Understanding the logic of the Itineraries:** Going beyond the structure and understanding the philosophy behind flexibility and life planning.
- **Develop active methodologies:** Enable the use of projects, case studies, and research, which are inherent to the core areas of the Federal Institutes.
- **Promote interdisciplinarity:** Offer tools and spaces so that teachers from different areas can plan and work in an integrated way.
- **Articulating theory and practice:** Connecting curricular content to social realities and problems, as well as those of the labor market.
- **Managing student autonomy:** Developing strategies to guide students in their choices and in the development of their projects.

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Furthermore, the introduction of full-time schools, where the Learning Pathways are
Once implemented, it adds another layer of complexity. In full-time schools, the curriculum
The expanded school day and the longer student stays require a differentiated pedagogical organization, which
promote student well-being and optimize learning time (BRAZIL, 2017). No
However, if the model does not work in practice – as 66.6% of teachers indicated in Question 6
–, This points to a disconnect between the ideal and operational reality. The lack of environments
The lack of adequate or adapted school supplies (Question 7) is an aggravating factor that undermines the potential for innovation.
pedagogically, it hinders the implementation of diverse activities and the use of teaching resources.
more interactive.

The pedagogical practice of teachers, therefore, is directly influenced by the conditions.
of work, through institutional support and the quality of training offered. The reform requires a
A change in attitude and teaching repertoire is needed, but this change will only take effect if the teachers are...
viewed as partners and not just as implementers of a policy.

2.4 The Amazonian Context: Unique Characteristics and Challenges for Implementing the Reform

The Amazon, marked by its vast territory, biodiversity and diversity.
Sociocultural context constitutes a unique setting for the implementation of educational policies.
national. The geographical dimensions and the dispersion of the communities impose logistical obstacles.
relevant issues, exacerbated by inadequate basic infrastructure and socioeconomic inequality,
which directly impact the provision of education in both remote areas and urban centers
like in Manaus. In the school environment, there is a lack of adequate spaces, laboratories, libraries, and access.
Technology hinders the effective implementation of the Training Itineraries, whose proposed flexibility...
Curriculum development and student leadership require robust material and pedagogical conditions. Furthermore,
the cultural specificities of the region, which is home to indigenous peoples, quilombola communities, riverside dwellers and
Urban populations demand that the reform engage with local knowledge and regional vocations.
avoiding the imposition of homogeneous models. Socioeconomic issues, such as low rates of
Human development and social vulnerability of students reinforce the challenge of engagement.
school-related issues require consistent pedagogical and psychosocial strategies, especially in schools of
full-time. In this scenario, qualitative research proves fundamental to understanding the
perceptions and teaching practices, allowing the identification of tensions between national guidelines and conditions.
local guidelines and point the way to a more contextualized and equitable implementation. In short, the
The effectiveness of high school reform in the Amazon depends on considering the variables.
structural, cultural, and socioeconomic factors that permeate the region, as well as attentive listening to
teachers who experience these challenges on a daily basis.

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2.5 Articulation of Theoretical Frameworks and Justification of the Research

The theoretical framework of this study outlined the conceptual elements and contextual factors that shape the implementation of the Training Itineraries in Brazil, with particular emphasis on the The role of the mathematics teacher and the specificities of the Amazon region. Discussions about curricular flexibility (BRAZIL, 2017; 2018a), educational innovation (MORAN, 2015) and critiques of reforms (FREITAS, 2018; CUNHA, 2017) show that the New High School represents Simultaneously an opportunity for modernization and a source of tension. The insertion of Mathematics in this arrangement demands a break with content-based teaching, valuing practical applications. contextualized and cultural, according to D'Ambrosio (2005) and Pires (2002), in line with the BNCC (BRAZIL, 2018b), which proposes competencies focused on problem-solving and the use of technologies, but it poses additional challenges for teachers due to the reduction in teaching hours. Basic General Training. The success of the reform depends on the training and professional development of teachers, as As Tardif (2002) and Libâneo (2012) point out, the perception of teachers in Manaus regarding the The inadequacy of continuing education confirms Marcelo's (2009) concerns about The need for contextualized and collaborative professional development. Thus, when analyzing The perception of mathematics teachers in a full-time school in the Amazon, the study It seeks to fill a gap in the literature by offering a situated perspective on the impacts of the reform. diagnosing challenges and possibilities and revealing how educational policies materialize. in the daily school routine. Teacher listening, supported by the theoretical frameworks discussed, provides resources. to improve continuing education, reassess implementation strategies, and contribute to a More equitable, relevant, and quality education for young people in the Amazon and Brazil.

3 METHODOLOGY

The exploratory-descriptive design of the research aims, on the one hand, to explore a a phenomenon still little investigated in its regional particularities – the implementation of Training Itineraries in the Amazon – and, on the other hand, to describe in detail the perceptions, difficulties and strategies adopted by mathematics teachers. The exploratory nature allows for the identification of new elements and questions that can support future investigations, while the descriptive nature It offers a true reflection of the reality experienced by teachers, contributing to the construction of a More contextualized knowledge about the effectiveness of the reform.

3.1 Ethical Aspects and Ethics Committee Approval

The research was conducted in accordance with ethical guidelines for studies involving human beings. The project entitled "An analysis of the itinerary implementation process formative experiences from the perspective of the mathematics teacher in the Amazonian context at a school of

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"Full-time research in Manaus/AM-Brazil in the years 2022-2023" was submitted to and approved by the Research Ethics Committee (CEP) of the Lutheran University Center of Manaus - CEULM/ULBRA, under the CAAE No. 74422723.3.0000.5014 and proof of submission No. 6.585.650, having been received for ethical review on September 25, 2023. All participants were informed about the objectives of the study, the guarantee of anonymity and confidentiality, and signed the Terms of Agreement. Free and Informed Consent (ICF) before data collection.

3.2 Research Environment and Subjects

The empirical field of the investigation was the Amazonas Institute of Education (IEA), a school. a traditional full-time public school located in Manaus and selected as a pilot unit for the implementation of the New High School curriculum in the state, assuming a strategic role in consolidating reform. The analysis of this institution's experience allowed us to observe conditions and challenges. challenges faced by teachers in implementing learning pathways in an environment that, Theoretically, it should have greater support and visibility. The sample, defined by convenience. and accessibility, it was composed of twelve licensed mathematics teachers, with different professional experience and performance in both Basic General Education and new areas curricular components. This diversity of trajectories and involvement with the reform. This allowed us to capture varied perceptions about the implementation process, contributing to a a more comprehensive and multifaceted analysis.

3.3 Data Collection Instruments and Techniques

For data collection, three complementary techniques were used, aiming at triangulating information and obtaining a more comprehensive understanding of the phenomenon studied (LÜDKE; ANDRÉ, 2013). The combination of different data sources – documents, closed questionnaires and open – it allowed for the comparison and validation of information, giving greater robustness to the results.

Bibliographic and Documentary Review:

- Legislation and Official Documents: This included a detailed analysis of Law No. 13.415/2017 (which instituted the reform), the National Common Curricular Base (BNCC), the National Curricular Guidelines for High School (DCNEM/2018), as well as specific ordinances and guiding documents from the State Secretariat of Education and Sports of Amazonas (SEDUC/AM) related to the implementation of the Formative Pathways.
  This analysis provided the normative and contextual framework for the reform, allowing for a comparison of the guidelines with observed practice.

- **Academic Literature:** Research was conducted in databases and scientific journals on the reform of secondary education in Brazil, mathematics teaching, teacher training, and the particularities of the Amazonian educational reality. This stage supported the construction of the theoretical framework and the interpretation of empirical data, establishing a dialogue between the research findings and the knowledge already produced in the area.

Questionnaire 01 (Closed/Mixed):

- Composed of 10 "yes" or "no" multiple-choice questions. This instrument aimed to gather an initial diagnosis of teachers' level of knowledge regarding the reform and the Learning Pathways, as well as their general perceptions of key aspects such as student development, the adequacy of training, and the functioning of the model in practice. Questions 1 and 5, although

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The applied factors were not tabulated in the final report because they did not have direct relevance to the analysis of the results focused on the perception and challenges of implementation.

Questionnaire 02 (Open):

- Structured around 17 open-ended questions, this instrument sought to deepen the perceptions of the teachers. The questions were designed to explore in greater detail the difficulties encountered, the possibilities envisioned, the daily challenges, and the impacts of implementing the Learning Pathways on their pedagogical practices. The open-ended responses allowed teachers to express their opinions, feelings, and experiences more freely and in detail, providing rich data for qualitative analysis.

3.4 Data Analysis Procedures

The data analysis followed an interpretative approach, based on content analysis.
thematic, as proposed by Bardin (2011), which consists of organizing and categorizing the data
qualitative methods in order to infer knowledge about the conditions of production and reception of
messages.

The analysis process involved the following steps:

1. **Preliminary analysis: This** consisted of a cursory reading of the collected materials (questionnaire responses and official documents). This initial stage allowed for immersion in the data, the formation of first impressions, and the selection of documents relevant to the analysis. Exploration of the material: Regarding the New High School Curriculum.

2. **Treatment of results, inference and interpretation:** Organization of thematic categories, triangulating the information obtained in the questionnaires (closed and open) with the theoretical framework and official documents. This triangulation allowed for a comparison of the teachers' perceptions with the reform guidelines and academic discussions, revealing the tensions between the prescribed, the idealized, and the experienced.

From this procedure, it was possible to understand how the teachers of
Mathematicians from Manaus perceive and experience the reform, identifying the main gaps in
The analysis sought to go beyond implementation, points of conflict, and adaptation strategies.
Surface of the data, searching for the underlying meanings in the teachers' statements and articulating-
those related to the Amazonian context and the challenges of Brazilian education. This approach allowed us to build
A critical analysis of the effectiveness of the reform and its implications for the school environment.
highlighting the importance of listening to teachers in order to improve educational policies.

3.5 Analysis Approach and Strategy: Integration of Methods

The study, predominantly qualitative in nature, adopted a mixed-methods strategy.
of the data alignment or incorporation type (CRESWELL, 2010), in which the quantitative method
It was integrated into a larger, qualitatively guided design, with the aim of providing support.
Complementary to the analysis. The quantitative data, originating from Questionnaire 01, were processed as follows:
descriptive in nature, they functioned as an initial diagnosis and a map of perception trends.
teachers, indicating consensus, divergences, and majority concerns. However, such data
They proved insufficient to explain the complexity of the phenomenon, and were further explored by...

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A qualitative analysis of the open-ended responses from Questionnaire 02, which contextualized and assigned meaning.
to the percentages obtained. The integration of the methods occurred in a complementary and sequential manner:
Quantitative data identified "what" and "how much" of certain perceptions, while
Qualitative studies explained "why" and "how" these perceptions manifested themselves, enriching the...
interpretation, ensuring a more robust and nuanced understanding of the reality being investigated.

4. ANALYSIS AND DISCUSSION OF RESULTS

An analysis of the responses from the twelve mathematics teachers at the Institute of Education of Amazonas (IEA) revealed a complex scenario regarding the implementation of the Training Itineraries. in the new high school curriculum. The findings indicate a mix of recognition of potential A reformist with a strong understanding of the practical challenges and gaps in its implementation. To ensure methodological consistency and in-depth discussion, the results They were organized into thematic categories, based directly on the questions in the Questionnaire. 01 (closed) and complemented by the rich narratives obtained in Questionnaire 02 (open), allowing A triangulation of data that enriches the analysis.

Table 1 – Summary of Teachers' Perceptions about the New High School Curriculum (Questionnaire 01)

Question	Description	To try (%)	No (%)
2	Does it effectively foster student development? 33.3% Does it work in the teaching-		66.7%
3	learning practice of teachers? 25.0% Have education professionals received adequate		75.0%
4	training? 41.7% Does the model work in full-time schools? 33.3% Are school environments		58.3%
6	in Manaus adequate and adapted? 25.0% Will students have better involvement in the		66.7%
7	job market with the new subjects? 58.3%		75.0%
8			41.7%
9	Are learning pathways an effective approach in educational development?	50.0%	50.0%
10	Do you have difficulty incorporating learning pathways into your teaching skills?	75.0%	25.0%

4.1 The Purpose of the New High School Curriculum: Between Holistic Education and Market Pragmatism

The analysis of teachers' perceptions revealed divergences regarding the primary purpose of The new high school curriculum, predominantly pragmatic and focused on professional integration. Question 8 of Questionnaire 01 indicated that most teachers believe that the new subjects They encourage students to engage with the job market, with 41.6% indicating this. Purpose was central, while 33.3% highlighted preparation for life and 25% for education. Superior. This division highlights a tension between the official discourse of the reform, which advocates Comprehensive education that articulates 21st-century skills, life planning, and continuity of... studies (Law No. 13.415/2017; DCNEM, 2018), and its implementation in school practice. A The predominance of the utilitarian perspective suggests that demands for employability and qualification Technical aspects may be overshadowing critical civic education, as highlighted by Freitas.

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(2018). Curriculum flexibility, by allowing for learning pathways, runs the risk of To instrumentalize education, reducing it to a means to immediate ends. The challenge lies in to ensure that, even when geared towards vocational training, the itineraries do not neglect the deepening of knowledge and critical development, as advocated by Libâneo (2012) and Sacristán (2000). The full-time school, with a longer school day, has the potential to reconcile these purposes, but the results demonstrate that such a balance has not yet been achieved in teachers' perception.

4.2 Main Challenges: Structure, Engagement, and Faculty Confusion

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- **Student Development (Question 2):** Most teachers answered "No" to the question of whether the new High School curriculum effectively fosters student development. This indicates a low perception of the reform's positive impact on student learning and growth, contradicting one of the central objectives of curriculum flexibility.

- **Functioning in Teaching Practice (Question 3):** The predominant answer to the question of whether the model works in the teaching-learning practice of teachers was "No". This data is alarming, as it suggests a disconnect between the proposal and the daily experience in the classroom, directly impacting the quality of teaching.

- **Adequate Teacher Preparation (Question 4):** Most teachers expressed that they had not received adequate preparation to work in this new model. This point will be explored in more detail in the next subsection, but it already stands out as a critical factor contributing to the insecurity and difficulties faced by educators.

- **Adapted School Environments (Question 7):** Teachers indicated that school environments in Manaus are not adequate or adapted for this type of teaching. This infrastructure issue is particularly relevant in the Amazonian context, as discussed in the theoretical framework (Subsection 2.4), where physical and resource limitations directly impact the ability to implement active and diversified methodologies.

- **Difficulties in Including Learning Pathways (Question 10):** Most teachers stated that they had difficulties in including learning pathways in their teaching skills. This highlights the complexity of adapting pedagogical practice to a new curricular model without adequate support and training.

These results from Questionnaire 01 find a profound echo in the open-ended responses, which contextualize and detail the sources of these difficulties. The main ones were:

- **Lack of student interest and discipline (75%):** This was identified as the main challenge. Although the reform aims precisely at student protagonism and engagement, teachers perceive a persistent disengagement. This problem may be linked to a lack of connection between the offered pathways and the students' real interests, to the precarious living conditions that affect school motivation, or to a difficulty on the part of the school itself in implementing the student's life project and conscious choice. The complexity of the Amazonian socioeconomic context (Minayo, 1996) is evident here, suggesting that disinterest may have deeper roots than just pedagogical ones.

- **Lack of infrastructure for application (58.3%):** This data corroborates Question 7 of the closed questionnaire. The lack of laboratories, specific teaching materials, adequate spaces, and technology prevents the implementation of more dynamic and experimental activities, which are essential for the axes of the Formative Itineraries (Scientific Investigation, Creative Processes, etc.). The absence of material conditions becomes an insurmountable obstacle to pedagogical innovation.

- **Difficulty in understanding the learning pathways by students (41.6%): If** the teachers themselves feel confused, it is expected that the students will also have difficulty understanding the purpose and structure of the pathways. The lack of clarity and guidance on the options and implications of each choice can lead to demotivation and the perception that the pathways are just another decontextualized “subject”.

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These findings corroborate the concerns raised in the Theoretical Framework regarding the distance between the idealized proposal of the reform and its implementation in the Brazilian school reality, particularly in the Amazonian context. The "confusion" and "difficulty in understanding" on the part of Students and teachers themselves are showing symptoms of an implementation process that has failed. to generate clarity, engagement, and the necessary material conditions for its implementation.

Table 2 – Thematic Categories and Illustrative Citations (Questionnaire 02)

Thematic Category Frequency (N=12)		Definition	Illustrative Quotes
I. Training Teacher Insufficient	100% (12 teachers)	Perception of inadequacy or lack of preparedness for the new demands of NEM and IF.	"The training was very theoretical; it didn't prepare us for the 'how to do' in the classroom." (Prof. 3) "We received little training, and what we did receive came from outside companies, out of context from our Amazonian reality." (Prof. 7)
II. Infrastructure Limitations	91.7% (11 teachers)	Lack of adequate physical and technological resources for the implementation of the IFs.	"We don't have adapted classrooms or laboratories for the activities proposed in the lesson plans." (Teacher 2) "The internet is bad, and without technology, how are we going to do real scientific research?" (Prof. 11)
III. Disengagement and Understanding of Students	100% (12 teachers)	Students' difficulty in engaging with and understanding the purpose of the Federal Institutes and the New High School curriculum.	"The biggest problem is student interest; they don't see themselves in the learning paths." (Prof.) 5) "They choose without knowing, then they become demotivated because they don't understand the purpose." (Prof. 9)
IV. Tension Curriculum of Mathematics	91.7% (11 teachers)	Conflict between the reduction of mathematics teaching hours at FGB and the demand for interdisciplinarity in the Federal Institutes.	"It's impossible to cover all the basic content with the reduced teaching hours and still think about the lesson plans." (Teacher 1) "We have to rush through the essential content, which takes away time from working on applied mathematics in the projects." (Teacher 8)
V. Institutional and Support Planning	75% (9 teachers)	Perception regarding the quality of support from school management and the Department of Education in the implementation	"Management tries hard, but the guidelines come from above and often don't fit our reality." (Prof. 4) "There is a lack of clearer planning and continuous technical monitoring from the secretariat." (Prof. 10)
VI. Potential and Innovation	50% (6 teachers)	Recognition of positive aspects and possibilities for improvement in the New High School curriculum.	"The idea of a life project is good, but the practice is very different." (Teacher 6) "It's possible to work on regional themes, such as sustainability, and make the class more interesting if we had support." (Teacher 12)

5. FINAL CONSIDERATIONS

The investigation revealed that the implementation of the Training Itineraries, although Based on a proposal for modernization and increased flexibility in education, it manifests itself in The reality of schools is complex and contradictory. An analysis of teachers' perceptions of Mathematics in Manaus, based on quantitative and qualitative data, revealed four central themes.

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One of the obstacles: student disengagement, cited by 75% of teachers as a reflection of a lack of... Interest and discipline; structural and training deficiencies, highlighted by 66.6% as a result. due to a lack of material resources, insufficient institutional support, and ongoing training. superficial; curricular tension, experienced by 91.6% of participants in the face of reduced workload. The scheduling of Mathematics and the difficulty in covering the curriculum; and the mismatch of purposes, evidenced by the divergence between teachers who see the reform as aimed at labor market (41.6%) and those who advocate for broader goals. The study reinforces the The need for dialogical processes that consider the real conditions of schools and value the... the teaching role, proposing as recommendations the creation of spaces for collective planning, the Strengthening pedagogical support and reassessing continuing education models, in order to to make them contextualized and collaborative. It is concluded that only with joint effort and Valuing the teacher's knowledge will make it possible to transform the potential of the New High School into an effective and beneficial reality for students.

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APPENDIX A – QUESTIONNAIRE

QUESTIONNAIRE 01 – Perceptions about the New High School Curriculum Format: Closed-ended questions with “Yes” or “No” answers

Note: Questions 1 and 5 were applied, but not tabulated in this report because they are not directly relevant to the analysis of the results.

Question # 1:	**Yes**	**No**
Did you know that the high school education model has been redesigned?	--	

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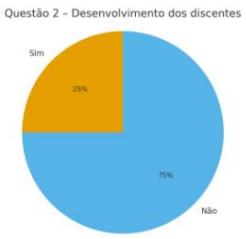
2. Believes that the new high school curriculum effectively fosters the development of 4 students?		8
3. Do you believe that the new high school system works, in relation to teaching practice? Teacher learning?	3	9
4. Do you think that education professionals have received adequate training to teach? In this new form of teaching?	5	7
5. Do you consider the educational pathways in full-time schools to be insufficient?	--	
6. Does the model proposed in the educational pathways in full-time schools work? 4 7. Is the environment of full-time		8
schools in Manaus adequate and adapted for this? 3 What type of education?		9
8. Do you think that with the new subjects, students will have better involvement in the market? work?	7	5
9. Do you see formative itineraries as an effective approach in development? Educational needs of students?	6	6
10. You have difficulties in including training pathways in your skills of teaching?	9	3

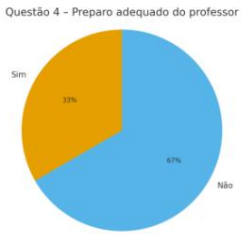
APPENDIX B – GRAPHS OF THE ANSWERS

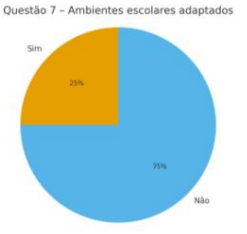
The following graphs show the percentage distributions of 'Yes' and 'No' responses to Questions 2 through 10.

The following graphs, corresponding to the tabulated questions, were generated to visually illustrate the collected data. Each graph represents the distribution of "Yes" and "No" responses per question, facilitating comparative analysis between items.

- Question 2 – Student Development
- Question 3 – Functioning in teaching practice
- Question 4 – Adequate teacher preparation
- Question 6 – Operation in full-time schools
- Question 7 – Adapted school environments
- Question 8 – Involvement with the job market
- Question 9 – Educational development of students.
- Question 10 – Inclusion of learning pathways in your teaching skills.







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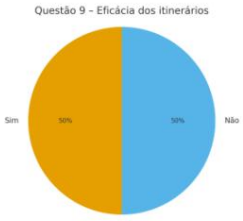
Year V, v.2 2025 | Submission: 08/11/2025 | Accepted: 10/11/2025 | Publication: 12/11/2025



APPENDIX B – QUESTIONNAIRE 02 – TEACHER RESPONSES

This appendix presents the summarized responses of the 12 teachers participating in the research, identified as Teacher 1 to Teacher 12. The responses were organized according to the 17 open-ended questions applied in Questionnaire 02, using scientific language and focusing on the reality of mathematics teaching in the Amazonian context. The accounts were written in indirect discourse, aiming to preserve the clarity and analytical coherence of the study.

1. How would you rate the implementation of the New High School curriculum at your school?

The teachers reported varying perceptions: some acknowledged progress in the proposed curriculum flexibility, while others emphasized the lack of clarity and structure for its effective implementation. Most highlighted that the reform was applied hastily, without sufficient dialogue with the teaching staff.

2. What were the main difficulties encountered in introducing the Learning Itineraries?

The responses indicated a lack of adequate training, a absence of teaching resources, and limited physical spaces. Several teachers cited a lack of technological materials and laboratories, which compromised investigative activities and interdisciplinary projects.

3. Was the continuing education provided sufficient to support the curriculum transition?

Most teachers reported that the training sessions were superficial, focused on theoretical aspects, and detached from the reality of the Amazon region. Only two teachers gave positive feedback on some of the training sessions promoted by SEDUC/AM.

4. How has the reform impacted your teaching practice in the area of Mathematics?

The teachers stated that the reform required significant methodological adaptations. The reduction in the mathematics teaching hours in the Basic General Education curriculum was identified as the main challenge to maintaining conceptual depth.

5. Are there noticeable changes in student engagement after the reform?

Overall, teachers reported low engagement. Many students do not understand the purpose of the learning pathways and have difficulty connecting the content to their own realities.

6. What positive aspects do you identify in the new teaching model?

Some teachers highlighted the potential of the Itineraries to promote student autonomy and encourage youth leadership. Others mentioned the opportunity to explore contextualized themes, such as sustainability and Amazonian culture.

7. Are students clear about their choice of learning pathways?

Most said no. According to reports, the lack of guidance and support during the selection process leads to confusion and demotivation among students.

8. How does the school's infrastructure influence the application of the Learning Pathways?

The responses revealed that structural limitations are one of the main obstacles. Lack of laboratories, multi-functional rooms, and restricted internet access hinder the use of active learning methodologies.

9. Which itinerary themes have been most developed at the school?

The teachers indicated that Scientific Research was the most frequently addressed area, followed by Creative Processes. The Entrepreneurship area, however, was the least explored, due to a lack of specific training.

10. How have the Learning Pathways contributed to mathematics learning?

According to the professors, there is potential for integration between mathematics and interdisciplinary themes, but...

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Lack of time and materials prevents consistent results.

11. Do you consider the full-time school model suitable for the new high school curriculum?

Half of the teachers see full-time schooling as an opportunity to expand learning, while the other half point to overload and a lack of adequate spaces for students to rest.

12. How would you rate the pedagogical support provided by the school administration during implementation?

Most acknowledged the management's efforts, but mentioned structural limitations and a lack of ongoing technical support.

13. Do the materials and resources provided meet the needs of the classes?

The responses were predominantly negative. There is a shortage of concrete and technological materials, hindering the implementation of innovative projects.

14. What changes have you noticed in the relationship between teachers and students after the reform?

Teachers observed a closer relationship in project-based activities, but also noted increased demotivation in traditional subjects.

15. What pedagogical strategies have you used to work with the Learning Pathways?

Active methodologies, interdisciplinary projects, and the use of regional themes, such as environmental preservation and the local economy, were mentioned. However, many stated that the application of these practices is still limited by a lack of time and technical support.

16. How do you assess the school community's receptiveness to the reform?

The responses showed initial resistance, especially from parents and students who did not understand the changes. Gradually, there is greater acceptance, although doubts persist.

17. What suggestions would you give to improve the implementation of the Training Itineraries?

The teachers suggested expanding practical training, ensuring better infrastructure conditions, and promoting greater dialogue between the Department of Education, schools, and teachers. They also suggested valuing local experiences and integrating Amazonian knowledge into the curriculum.

Note: The responses presented were synthesized from the narratives of the 12 participating teachers, with the aim of representing the general trends in teachers' perceptions about the implementation of the New High School Curriculum and the Learning Pathways in the Amazonian context.