Sociedade Brasileira de Educação Matemática

RIPEM

Assessment practices of teachers that teach mathematics in a public high school in Rodrigues Alves – Acre

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2238-0345 ISSN

10.37001/ripem.v15i3.4563 doi

Received • 26/04/2025
Approved • 02/06/2025
Published • 01/09/2025

Editor • Gilberto Januario

Abstract: This study examined the assessment practices of mathematics teachers in high school in Rodrigues Alves, Acre, with the aim of investigating how these practices are consolidated and their implications on the teaching and learning process. It is a case study of a qualitative nature, which used bibliographic research, document analysis, and field research. The empirical data were collection through a questionnaire applied to two mathematics teachers from a state school. The analysis of bibliographic, documentary, and field data was conducted through Discourse Textual Analysis. The results revealed the use of various tools, such as tests, mathematical games, mind maps, and rubrics, in addition to methodologies such as individual and group work. It was concluded that, despite the challenges, teachers seek to diversify their assessment practices, contributing to more contributing and effective teaching.

Keywords: Learning Assessment. Mathematics Teaching. High School. Teaching Practice.

Práticas avaliativas dos professores que ensinam matemática no ensino médio em uma escola pública de Rodrigues Alves – Acre

Resumo: Este trabalho investigou as práticas avaliativas dos professores de matemática do Ensino Médio de uma em Rodrigues Alves, Acre, com o objetivo de compreender como se consolidam e quais são as implicações dessas práticas no processo de ensino e aprendizagem. Trata-se de um estudo de caso, de natureza qualitativa, que utilizou pesquisa bibliográfica, análise documental e pesquisa de campo. Os dados empíricos foram coletados por meio de questionário, aplicado a dois professores de matemática de uma escola estadual. A análise dos dados bibliográficos, documentais e de campo foi realizada por meio da Análise Textual Discursiva. Os resultados revelaram a utilização de instrumentos variados, como provas, jogos matemáticos, mapas mentais e rubricas, além de metodologias como trabalhos individuais e em grupo. Concluiu-se que, apesar dos desafios, os professores buscam diversificar suas práticas avaliativas, contribuindo para um ensino mais inclusivo e eficaz.

Palavras-chave: Avaliação da Aprendizagem. Ensino de Matemática. Ensino Médio. Prática Docente.

Prácticas evaluativas de los profesores que enseñan matemática en la educación secundaria de una escuela pública en Rodrigues Alves – Acre

Resumen: Este estudio investigó las prácticas evaluativas de los profesores de matemáticas en la educación secundaria en Rodrigues Alves, Acre, con el objetivo de analizar cómo se consolidan estas prácticas y cuáles son sus implicaciones en el proceso de enseñanza-

aprendizaje. Se trata de un estudio de caso de carácter cualitativo, que empleó investigación bibliográfica, análisis documental e investigación de campo. Los datos empíricos fueron recolectados mediante un cuestionario, aplicado a dos profesores de matemáticas de una escuela estatal. El análisis de los datos bibliográficos, documentales y de campo se realizó a través del Análisis Textual Discursivo. Los resultados revelaron el uso de diversas herramientas, como exámenes, juegos matemáticos, mapas mentales y rúbricas, además de metodologías como trabajos individuales y grupales. Se concluyó que, a pesar de los desafíos, los profesores buscan diversificar sus prácticas evaluativas, contribuyendo a una enseñanza más significativa y eficaz.

Palabras clave: Evaluación del Aprendizaje. Enseñanza de Matemáticas. Educación Secundaria. Práctica Docente.

1 Introduction

The process of teaching and learning plays a vital role in students' overall development. Achieving this involves the coordination of multiple factors, especially the assessment of educational progress, which is a key element in verifying the level of student learning and identifying areas for improvement. To accomplish this goal, it is essential to evaluate students' progress continuously and systematically.

As the assessment of school learning is a crucial part of the educational process, understanding how it takes place is of relevance and contributes to the advancement of education. Accordingly, this study is justified by the contribution it can offer to mathematics education in high school, by understanding teachers' evaluative methods, it becomes possible to recognize key aspects in the assessment process, which may lead educators to reflect on their practices. This reflection can help to understand whether actions of this nature are really positively influencing teaching and student learning, contributing to making assessments more effective.

Identifying the assessment practices used in the school context in the teaching of mathematics in the municipality of Rodrigues Alves means investigating which knowledge and evaluation methods are being used or applied, which of them are used more frequently, and which are not, with the aim of answering the following question: *How do the assessment practices of mathematics teachers in Rodrigues Alves (Acre) occur, and what are their implications?*

From the research problem arise the following study questions: *What elements guide the discussion on learning assessment in the context of high school mathematics? How do high school mathematics teachers assess students in a school located in the municipality of Rodrigues Alves? And what are the critical perceptions and effects of the assessment methods used in high school mathematics in Rodrigues Alves?*

This way, the central objective of this study is: *"To investigate how the assessment practices of high school mathematics teachers in the municipality of Rodrigues Alves (Acre) are consolidated, and what implications they entail"*. Moreover, the study seeks to achieve the following specific objectives: Discussing the assessment of school learning of mathematics within the context of high school; to identify the assessment practices of high school mathematics teachers in a school located in Rodrigues Alves; and to analyze the assessment processes in high school mathematics in a school in Rodrigues Alves, critically outlining the effects of the commonly used evaluation methods.

This study is organized into three main sections, apart from the introduction and final remarks. The first section, entitled *"Assessment of School Learning"* explores the topic from

various theoretical perspectives and in light of relevant normative documents. In the second section, *"Assessment of Learning in High School Mathematics",* the focus shifts to the specific stage of education investigated in this study. The third section, *"Assessment Practices of High School Mathematics Teachers in a School in the Municipality of Rodrigues Alves,"* presents the mathematics teachers' perceptions regarding learning assessment, including the analysis of data collected during the field research. It aims to understand the assessment practices adopted by the teachers, as well as the challenges and limitations encountered in mathematics learning.

2 Assessment of School Learning

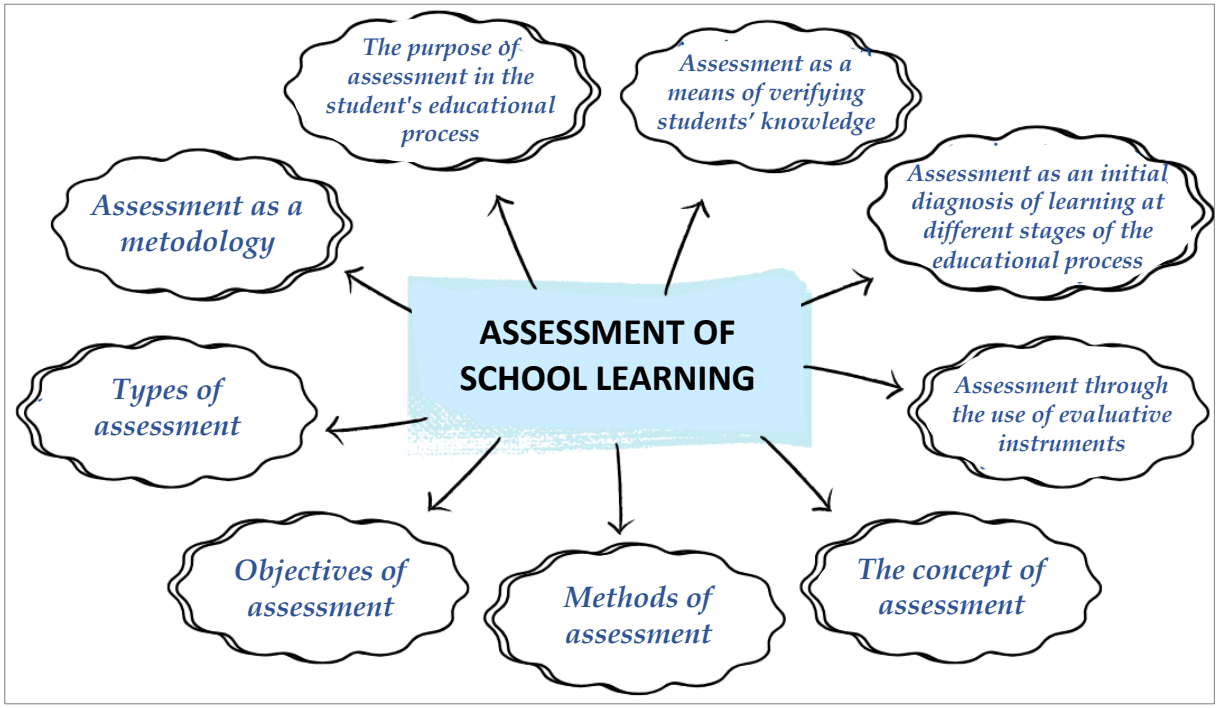
School learning assessment, as prescribed within educational systems, is guided by legal and regulatory instruments such as laws, ordinances, official reports, resolutions, and curriculum documents. These are established to direct the various levels and modalities of education, in accordance with the institutions that form the structural framework of education in Brazil. Furthermore, this assessment is grounded in a range of educational theories.

In this section, attention is directed to the analysis of several of these documents, which, after being examined, were organized into categories that outline the legal provisions regarding assessment in high school. These categories span from national guidelines to the local level, where the research subject is situated. In addition, the work of scholars who contribute significantly to the discourse on school learning assessment is also analyzed.

Therefore, based on the examination of the Law of Guidelines and Bases of National Education (LDB) No. 9.394/1996, the National Common Curricular Base (BNCC), Resolution No. 246/2019 of the State Council of Education of Acre (CEE/AC), the National Curriculum Parameters (PCNs), the school's Political-Pedagogical Project (PPP), and a Mathematics Didactic Sequence (SD) from the research site, the following dimensions related to assessment were identified: assessment as a methodology; the purpose of assessment within the student's educational process; assessment as a means of verifying students' knowledge; assessment as an initial diagnostic of learning throughout the stages of the educational process; and assessment conducted through evaluative instruments.

Just as the normative elements are diverse, scholars dedicated to research on assessment are likewise varied, offering significant contributions to the understanding of this practice. In this Regard, we analyzed their contribuitions and organized them into categories that enable the examination of assessment from multiple perspectives. To that end, the works of Haydt (2008), Villas Boas (2022), Libâneo (1994), Enguita (1989), Luckesi (2002, 2011), Hoffmann (2003, 2009), Balardim (2022), and Ferraz and Macedo (2003) were analyzed. These analyses led to the identification of the following categories: the concept of assessment, methods of assessment, objectives of assessment, and types of assessment (Figure 1).

Figure 1: Assessment of School Learning.



Source: The authors (2025).

One of the ways to conceptualize the assessment of school learning is to understand it as a methodological process. In this sense, assessment is recognized both in the National Education Guidelines and Framework Law (LDB), specifically in Chapter II, Article 36, and in the National Common Curricular Base (BNCC), as well as in Opinion No. 246 issued by the State Education Council of Acre (CEE/AC). In all three documents, assessment is presented as a strategy to promote student learning development. It is thus understood as a formative and constructive process, shaped by a combination of learning contexts and conditions. These contexts and conditions should be regarded as elements that reflect what has been achieved throughout the teaching and learning process, whether in terms of academic progress or performance within the formative process.

The school, teachers, and students are key figures in this process. It is essential to understand that, for a methodology to be effective in the teaching and learning process, it must adopt strategies that enhance the development of students' skills and competencies. These reflections are present in the three aforementioned documents, which guide both national and state education policies. They present assessment not merely as the application of an instrument, but as a dynamic and methodological process to be observed through the student's development.

In the student's educational process, the purpose of assessment is addressed in Article 36 of the LDB, in the National Curriculum Parameters (PCNs), and in Article 12 of Opinion No. 246 of the State Education Council of Acre (CEE/AC), where it is understood as a fundamental component of the educational process. This reflects a shift away from a traditional and reductionist view of assessment toward its conception as a guiding element in the teaching and learning process. Its function is to inform pedagogical interventions to be carried out by the teacher, with the aim of ensuring that the student develops the competencies and skills required at their current stage.

Both Article 36 of the LDB and Opinion No. 246 of the State Education Council of Acre (CEE/AC) establish that, by the end of high school, students should be able to apply the

knowledge acquired throughout their educational journey, understand scientific and technological principles, learn through social interaction in their daily lives, and master contemporary forms of communication. Mastery of these skills aims to provide students with a critical understanding of the world, preparing them to face challenges and to become active citizens within their social environment.

As a check on students' knowledge, assessment represents one of the most important stages in the teaching and learning process. Among its various functions, its role in evaluating students' understanding stands out as particularly significant.

What criteria, then, should guide this verification process? A LDB, em seu Art. 24, determina que essa verificação deve ser continua e cumulativa, priorizando os aspectos qualitativos em detrimento dos quantitativos. Article 24 of the LDB states that assessment must be continuous and cumulative, prioritizing qualitative aspects over quantitative ones. Furthermore, it allows for the possibility of student advancement if their level of learning exceeds the current educational stage, particularly in cases of academic delay. Another essential criterion is the recovery of content for students with low performance—an obligatory measure that must be outlined in each school's pedagogical guiding document (Brazil, 2023).

In the Pedagogical Project (PPP) of the school participating in this study, item 3.3 addresses the "Organizational Structure of the School." It specifies that assessments aimed at verifying student learning must comply with Normative Instruction No. 04, dated April 13, 2004, issued by the State Department of Education of Acre. This regulation stipulates that students shall be evaluated using a grading scale from 0 to 10 points during each academic quarter, both at the elementary and secondary levels. The results obtained are to be communicated to students and their guardians to foster an effective partnership between school and family, thereby supporting the full student's development. This communication takes place quarterly through the school report card.

In the two documents mentioned above, it can be seen that assessment is used to gauge students' knowledge, within a framework that seeks to ensure maximum efficiency.

As an initial survey of learning, assessment takes on another important function:identifying students' prior knowledge. This practice is known as diagnostic assessment, and both the CEE/AC Opinion No. 246/2019 and the school's PPP regard this form of evaluation as a means of determining what students know at the start of a topic, subject, or stage in the educational process. Its aim is to identify what the student already understands and, based on the results, to provide guidance for the teacher's pedagogical planning. This type of assessment also allows for the detection of learning gaps, enabling teachers to implement pedagogical interventions that support students' overall development throughout the learning process.

Assessment with/by assessment instruments is a point that requires emphasis. When discussing assessment, it is precisely these instruments that stand out in defining the criteria, indicating "what to assess" and "how to assess". Several documents address this issue, including the National Curriculum Parameters (PCNs) (Brazil, 1997), CEE/AC Opinion No. 246, the school's PPP, and the mathematics teacher's didactic sequence. These documents advise that teachers should use different forms of language when assessing, using both oral and written modalities, whether verbal, oral or written, with resources such as observation, production analysis, cultural events, seminars, projects, oral and written tests, exercises, class participation and other instruments they deem appropriate.

This ensures that all students are assessed according to their individual skills, reflecting the teacher's genuine concern for the learning process. These instruments must be aligned with the adopted methodology, the content, and the subject areas while adhering to pre-established criteria and learning objectives. In doing so, it becomes possible to promote a more inclusive, effective, and equitable assessment, enabling students to demonstrate their potential in a more meaningful way.

Throughout the teaching and learning process, students are continuously assessed. But what does it mean to assess? It is an attention demanding stage, widely discussed by various scholars. According to Haydt (1998), assessment is a value judgment based on predefined standards and criteria.

Assessment should be viewed from the perspective of its value to student development. Libâneo (1994), Enguita (1989), and Villas Boas (2022) both agree that assessment goes far beyond the mere administration of tests or assignment of grades. It is a continuous process that involves reflection not only on pedagogical practice but also on students' learning. This approach allows for a broader understanding of assessment, recognizing it as a valuable tool that supports teachers in their pedagogical pratice.

These authors consider assessment to be an important tool for educational success. Because it is a continuous process, linked to teaching and learning objectives, it must be understood in its multiple dimensions and potential, as an ally in the construction of knowledge.

There are also different forms of assessment - from the more traditional, such as tests and exercises, to the less conventional, such as self-assessment. According to Villas Boas (2022), when tests, written activities or productions are used, what she calls formal assessment is applied. This type of assessment aims to assign a grade or concept to the student's performance and is generally known to all those involved: students, parents and teachers.

On this point, Ferraz and Macedo (2003) argue that although formal assessment has a classificatory nature, it also generates reflection and encourages self-assessment. When students are aware that they are being assessed, they tend to make an effort to meet the expectations placed on them and even the expectations they create, as well as becoming aware of their development, abilities and limitations. Critical reflection on their own learning generates motivation for continuous improvement and reinforces a sense of personal responsibility.

Another key aspect concerns the objectives of assessment, which address the question: ″Why assess?" One of the leading scholars on this topic is Luckesi, who defines the purpose of assessment as "investigating the quality of student learning in order to diagnose obstacles and, if necessary, propose solutions that enable the achievement of desired outcomes" (Luckesi, 2011, p. 175). For him, assessment is a dynamic and constructive process that supports the teacher's instructional practice by identifying learning gaps and guiding efforts to overcome them.

In agreement with Luckesi (2011), Hoffmann (2003) argues that the purpose of assessment also includes fostering autonomy in the educational process, enabling teachers to understand the backgrounds, experiences, and difficulties of their students. This understanding allows for the development of meaningful and challenging instruction, in which the student becomes both the focus and the agent of their own learning process, ultimately becoming critical and autonomous.

According to Haydt (2008), assessment serves three primary functions: diagnosing, monitoring, and classifying. Corresponding to these functions are three types of assessment: diagnostic, formative, and summative.

Diagnostic assessment is conducted at the beginning of the learning process with the aim of identifying students' prior knowledge and using it as a foundation for constructing new understandings. Luckesi (2002, p. 44) emphasizes that diagnostic assessment is "a fundamental tool to assist each student in developing competence and autonomy, which will always ensure reciprocal relationships." Thus, diagnostic assessment goes beyond merely identifying what students already know; it constitutes a dialogical process that fosters self-awareness and autonomy in relation to one's own development.

Given its critical role in fostering reflection and supporting the development of new knowledge, Balardim (2022) emphasizes the diagnostic assessment as a valuable tool for identifying gaps in student learning. Many educators use this strategy to determine whether students struggle with specific content so that, when necessary, recovery actions can be implemented. In this way, students are given the opportunity to overcome learning difficulties and acquire new knowledge.

Formative assessment serves as an essential ally to the teacher. Due to its continuous nature, it enables the daily monitoring of students' content assimilation. According to Villas Boas (2022), this type of assessment allows the teacher to identify potential learning difficulties, facilitating instructional decision-making and benefiting both teacher and student. Melo, Pereira, and Glotz (2021, p. 10) argue that "the action of formative assessment is carried out for the benefit of the student and occurs fundamentally through the closeness between the educator and the learner." This proximity enables the teacher to gain insight into students' challenges and strengths.

Lastly, summative assessment is conducted at the end of a given period. These are periodic evaluations that take place at the conclusion of learning cycles—such as bimonthly assessments at the end of two academic months, semester assessments after six months, or broader evaluations like annual or multi-year assessments, which may be instituted by educational systems. Among the most well-known examples are the *Exame Nacional do Ensino Médio* (ENEM) and *Provinha Brasil*. According to Haydt (2008), such assessments serve a classificatory function, as they aim to categorize students based on their performance according to pre-established criteria..

This section has made it possible to examine the assessment of school learning in light of legal instruments works as well as through the perspectives of prominent scholars who seek to understand and explain educational assessment. Building on this theoretical foundation, we can now proceed to a more in-depth discussion of the implications of school assessment in mathematics in the High School, which will be explored in the following section.

3 Assessment of learning in High School Mathematics

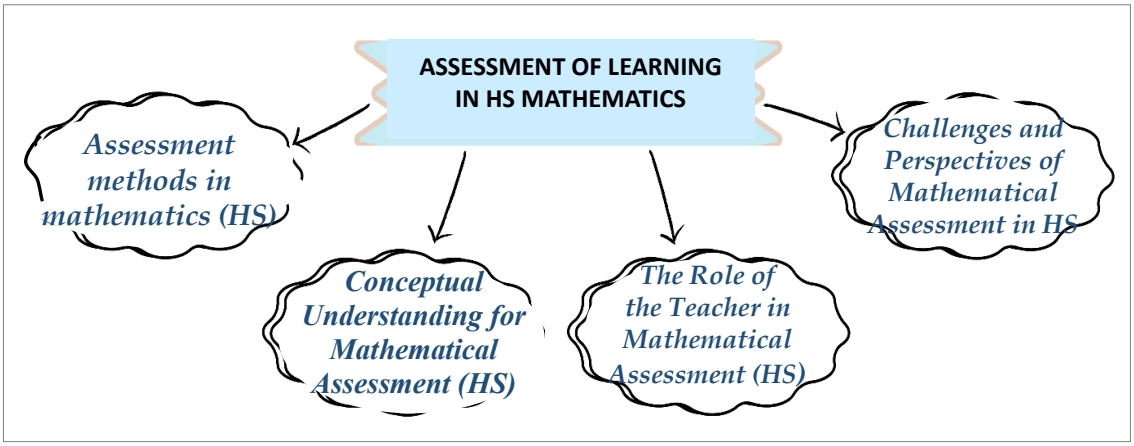
Assessment has drawn the close attention of researchers seeking to understand both the teaching and learning process and the functioning of the educational system as a whole. These scholars offer various perspectives regarding students' academic performance and, more specifically, on the assessment of learning in Mathematics at the secondary education level.

Accordingly, this section addresses the assessment of learning in the subject of Mathematics at the secondary education level through the lens of various researchers, whose contributions have been organized into analytical categories. These categories are grounded in the work of the following authors: Pavanello and Nogueira (2006), Onuchic and Allevato (2011), Onuchic (2013), Cury (1995), Buriasco (2004), Pereira, Mendes, and Rocha (2020), Piletti (2001), Morais and Moura (2009), Brasil (2018), Kistermann Jr. and Glanszmann (2019), Rodrigues (2020), Luckesi (2011), and Perrenoud (1993).

The analytical elements concerning assessment in secondary education have been organized into the following categories: Assessment Methods in Mathematics Education in High School; Conceptual Understanding for Mathematical Assessment in High School; The Role of the Teacher in Mathematical Assessment in High School; and Challenges and Perspectives of Mathematical Assessment in High School.

Incidentally, these challenges and perspectives are illustrated in the image below (Figure 2):

Figura 1: Assessment of learning in HS mathematics



Source: The Authors (2025).

Playing a significant role, assessment in high school mathematics education contributes to understanding learning processes and improving teaching practices. Although it **belongs to** a field of knowledge that Pavanello and Nogueira (2006, p. 39) described as "arid and distant from social and political issues," its practices are far from impersonal. Quite the opposite: the assessment processes in this context are intrinsically connected to the subjectivity of the evaluator, as the one who assesses brings with them a set of knowledge and personal beliefs that underpin their evaluative practice.

Regarding the category "Assessment Methods in the Teaching of Mathematics in High School" — the first category of analysis — it is observed that teachers frequently employ a variety of approaches, such as: (1) assessment through problem-solving; (2) analysis of the role of error in the learning process; (3) use of exercises; and (4) administration of tests.

In the case of mathematics assessment through Problem Solving, the problem is viewed as the starting point in the construction of knowledge. According to Onuchic and Allevato (2011), it is through problem that students establish connections between different areas of mathematics and their prior learning in order to construct new knowledge — leading up to the finish line, which is the problem's resolution. Onuchic (2013) further emphasizes the importance of teamwork within this methodology, as different perspectives enrich the process and support the achievement of the objectives proposed by the teacher.

Another important aspect is the role of error in mathematics assessment at the secondary education level. Cury (1995) views error as a pedagogical tool that enables teachers to identify curricular and methodological issues. When the evaluator calmly analyzes the mistakes made by students and reflects on them, they may observe potential problems in the curriculum, in the instructional methods employed, or in the way content is being presented. By investigating the necessary adjustments with a focus on students' cognitive processes, this approach promotes more effective and meaningful learning.

In addition to the previous point, the use of exercises also warrants emphasis, given its close correlation. Exercise solving should not be viewed merely as a means of obtaining right or wrong answers. When proposing exercises, the teacher can observe various fundamental elements, such as:

- the way in which the student interpreted the task in order to provide an answer;
- the choices made by the student to carry out the task;
- the mathematical knowledge the student applied;
- whether or not the student used the mathematical content presented in class;
- the student's ability to communicate mathematically, either orally or in writing. (Buriasco, 2004, p. 20).

From this perspective, it is essential that the educator adopt a sensitive and attentive approach when analyzing a student's solution, as this is precisely when their actual skills and learning needs become most evident.

Regarded as the most traditional form of assessment, the test offers certain benefits for measuring developed skills. According to Piletti (2001, pp. 196–197), "in a test, students complete a uniform set of tasks and are fully aware that they are being assessed." During the test, students are conscious of the evaluative nature of the activity and apply themselves to answering the questions posed by the teacher, based on previously studied content, in order to demonstrate their intellectual abilities.

Pereira, Mendes, and Rocha (2020) emphasize that tests allow students to express their competencies, reveal their difficulties, and become more independent in how they approach problem-solving, thereby regulating their own learning. For the teacher, the results obtained from tests can serve as a valuable tool for effective intervention, as they provide insight into each student's individual performance and particularities—ultimately enriching the educational process.

The second category identified in this segment of the analysis underscores the importance of students' appropriation of mathematical concepts. For this process to be effective, it is imperative that the teacher possesses a thorough understanding of the underlying cognitive mechanisms. In this context, Morais and Moura (2009) argue that in order to assess effectively in Mathematics, it is necessary to consider the concept being taught, its connections to previously acquired knowledge, and the cognitive processes that enable conceptual appropriation.

When focusing on teaching theoretical mathematical knowledge, the teacher must go beyond merely observing students' performance. It is also necessary to analyze the behaviors demonstrated throughout the teaching and learning process in order to determine whether students have truly appropriated the concept presented. To do so, the teacher must possess a solid command of the content being taught and a clear understanding of the mental processes required for its assimilation by the students.

But why assess students' appropriation of mathematical concepts? Because students will apply these concepts to solve real-life problems, and the BNCC (Brazil, 2018) establishes, as the first specific competency for Mathematics in high school, the ability of students to use mathematical strategies, concepts, and procedures to address real-world situations. This

competency aims to enable them to become active and engaged citizens within their social environment.

The third section addresses the role of the teacher in the assessment of Mathematics in high school, as there are numerous perspectives that must be considered to conduct an honest and meaningful evaluation for both the one who teaches and the one who learns. First and foremost, it is essential that the teacher engages in the study of assessment, critically reflecting on their own instructional practices. Kistermann Jr. and Glanszmann (2019) argue that by studying this subject and reflecting on their own practice, educators develop new knowledge that guides them toward adopting new approaches, implementing necessary improvements for more effective teaching, or refining existing strategies. In doing so, teachers demonstrate a commitment to education and the improvements these actions do in mathematics teaching.

It is also essential that the teacher possesses a varied repertoire of assessment tools. By being familiar with different evaluation instruments, the teacher is better able to determine the most appropriate forms of assessment, according to the specific learning situation proposed.

Rodrigues (2020) argues that when teachers integrate a variety of assessment tools into their instructional practice, evaluating students across diverse competencies and applying clear criteria, they achieve more consistent results. These outcomes can be used as complementary elements in the learning process, reinforcing students' academic development.

Kistermann Jr. and Glanszmann (2019), in agreement with Rodrigues (2020), assert that more important than the content to be taught or learned is the teacher's role in mediating between knowledge and the student. Throughout this mediation process, the teacher observes the student's development across various competencies. Thus, assessment transcends the mere act of correcting assignments or exams, or assigning grades; it becomes a meaningful practice and an essential ally in the educational process.

On this basis, the lack of a structured assessment methodology for mathematics teachers may be a significant challenge in their professional practice. Faced with this situation, Rodrigues (2020) argues that it is the teacher's responsibility through critical reflection on their own practice to determine the educational goals and aspirations they aim to achieve in relation to their students' development. This involves breaking away from traditional assessment practices, which are often limited to the classification of learning through numerical or conceptual scales. By doing so, the teacher redefines the evaluative process, promoting a more humanized, creative, and autonomy-oriented approach to teaching.

Finally, we turn to the fourth and final category of this section of the analysis, which addresses the challenges and perspectives of mathematics assessment in upper secondary education. This is a topic that demands deep reflection, particularly in light of the complexities that shape teaching practice within the educational process. Luckesi (2011) highlights a common confusion between the concepts of "examination" and "assessment." While examinations focus on measuring final outcomes, assessment should emphasize the process of knowledge construction without disregarding the end result. In the context of mathematics, this distinction is particularly significant, as the discipline requires not only the memorization of formulas and procedures but also the development of essential skills such as logical reasoning, problem-solving, and critical thinking.

Perrenoud (1993, p. 180) defines assessment as a process that "helps the student to learn and the teacher to teach." In mathematics, this requires a continuous and formative approach that identifies difficulties, values progress, and adapts to the non-linear nature of learning that we can see in mathematics, marked by trial, error, and adjustment.

Given this context, mathematics assessment in High School must go beyond the mere application of exams and embrace a formative, process-oriented approach. Its primary aim should be the holistic development of students, preparing them not only for academic challenges but also for the critical application of mathematical thinking in everyday and professional contexts. To achieve this, educators must re-evaluate their assessment practices, aligning them with students' real needs and the contemporary goals of mathematics education.

4 Assessment Pratices of High School Mathematics Teachers in the Municipality of Rodrigues Alves

Methodologically, this is a case study with a qualitative approach, conducted through bibliographic, documentary, and field research.

Case studies aim to thoroughly understand and interpret individual cases within a specific context and to reveal information about their dynamics and processes (Gomes Neto, 2024). To investigate the case in question, the research was initially carried out as a bibliographic study.

Bibliographic research is a fundamental component in the development of academic studies. According to Amaral (2007), it "[…] influences all stages of research, insofar as it provides the theoretical foundation on which the work will be based. It consists of collecting, selecting, organizing, and archiving information related to the research" (Amaral, 2007, p. 1). In the bibliographic analysis, guiding elements related to the assessment of mathematical learning in high school were explored through books, articles, and monographs accessed via platforms specialized in academic research.

Subsequently, the research turned to documentary analysis, which refers to "[…] a procedure that employs methods and techniques for the apprehension, understanding, and analysis of documents of various types" (Sá-Silva, Almeida & Guindani, 2009, p. 5). Documents that guide national education were examined, such as the National Common Curricular Base (BNCC), the Law of Guidelines and Bases of National Education (LDB), the National Curricular Parameters (PCNs), as well as Resolution No. 246/2019 of the State Education Council of Acre. Additionally, institutional documents were analyzed, including the Pedagogical Political Project (PPP) of the school where the field research was conducted and a didactic sequence from a mathematics teacher at the same institution.

Finally, in the third and final phase, field research was conducted, which consists of obtaining information directly from the research participants. As Gonsalves (2001, p. 67) explains, "in this case, the researcher must go to the setting where the phenomenon occurs [...] and gather a set of information to be documented [...]." The procedure adopted involved the administration of a printed questionnaire to mathematics teachers at a High School in the municipality of Rodrigues Alves (Acre).

Data collection with the mathematics teachers at a state school in the municipality of Rodrigues Alves, in the state of Acre, was carried out through a printed questionnaire, in which the research participants freely wrote their responses to the proposed questions. The questionnaire included a heading for the insertion of personal and professional background information, followed by six open-ended questions designed to gather specific data for the present study. After a clear explanation of the research proposal and the signing of the Informed Consent Form, the two participating teachers received the questionnaire and later returned it duly completed.

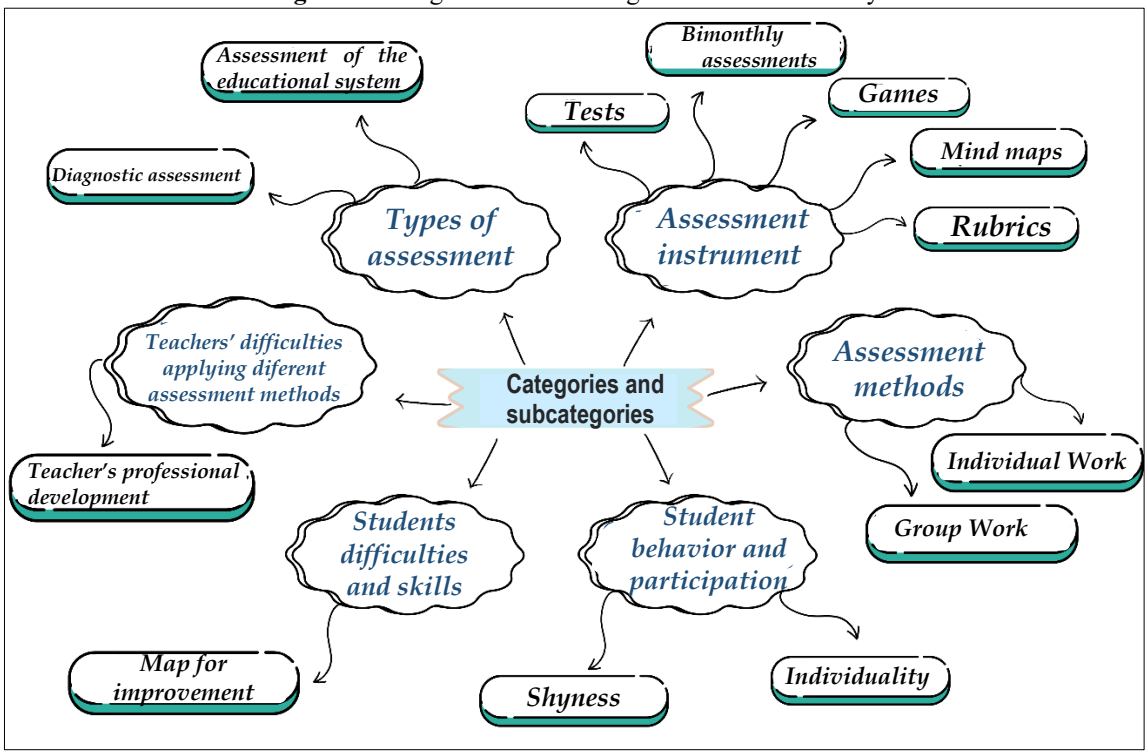
The first participant is male, 47 years old, and holds a degree in Mathematics Education. He has been working as a teacher for 21 years, 12 of which have been dedicated to teaching Mathematics. In this analysis, he will be referred to as Teacher 01. The second participant is female, 50 years old, and holds degrees in both Pedagogy and Mathematics. She has been working in education for 26 years, 17 of which were spent in leadership positions in school management. She has 9 years of experience teaching Mathematics exclusively and will be referred to as Teacher 02.

Based on the data collected through the applied methodologies, we employed the Discursive Textual Analysis (DTA) method, which enables an in-depth and detailed examination of the collected data. According to Moraes (2003, p. 191), DTA is "[…] the understanding of phenomena […] through a rigorous and critical analysis of this type of information; that is, it does not aim to test hypotheses in order to confirm or refute them at the end of the research; rather, its intention is understanding."

The application of the method followed three distinct stages. The first is the unitarization of the research corpus, which consists of segmenting and fragmenting the texts gathered during data collection, including bibliographic, documentary, and field research materials. The second stage is categorization, in which the data are synthesized and organized into categories, taking into account language, thematic focus, and meaning. The third and final stage is the writing of so-called metatexts, which refers to the final product of DTA. At this stage, the researcher formulates interpretations and analytical constructions based on the texts analyzed, including inferences about the context in which they were produced.

Using Discursive Textual Analysis (DTA) as the methodological framework for the systematization and interpretation of the data, the following central categories were identified based on the analysis of the questionnaires: Types of assessment; Assessment instruments; Assessment methods; Student behavior and participation; Student difficulties and skills; and Teachers' difficulties in applying different assessment methods.

Figure 2: Categories and subcategories of the field study



Source: The Authors (2025).

After analyzing the questionnaire responses provided by the teachers and applying the study's typology to the research, the category *Types of Assessment* was subdivided into two dimensions: *Diagnostic Assessment* and *Assessment of the Educational System*.

It was observed that both teachers employ diagnostic assessment, a common practice at the beginning of the academic year, a new stage, or the introduction of new content, with the aim of measuring students' prior knowledge and identifying potential learning difficulties. The most frequently used instrument for this purpose is the individual test, although other tools may also be employed. Based on the results obtained, the teachers adjust their pedagogical practices by planning the necessary interventions to address any difficulties demonstrated by the students.

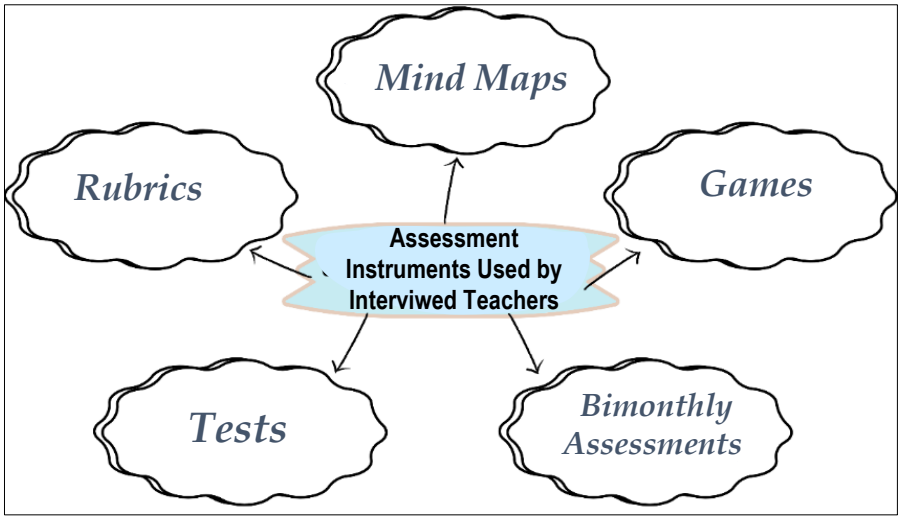
The use of assessments provided by the education system, issued by the Department of Education, was also mentioned. These assessments aim to diagnose possible learning gaps in relation to the previous school year or grade level. After their administration, teachers carry out the correction process using spreadsheets, which clearly indicate the skills assessed in each question and the students' performance, categorized as insufficient, fair, good, or excellent.

Both types of assessment mentioned by the teachers share the same objective: to verify students' level of learning and determine whether they are ready to advance or if there is a need to reinforce foundational knowledge before moving forward.

In the analysis of the responses related to the item *Assessment Instruments*, a certain conceptual confusion was identified between instruments and methods of assessment. Assessment instruments are tools used to collect data on student performance, whereas methods refer to the strategies and techniques employed in the application of these instruments.

ssessment instruments mentioned by high school mathematics teachers are represented in the image below (Figure 4).

Figure 3: Assessment Instruments Used by Interviwed Teachers



Source: The Authors (2025).

The test is the most frequently used assessment instrument, applied to measure students' knowledge of specific content through objective, subjective, or oral questions, which may be administered individually or in groups, with or without consultation.

It was also observed that the teachers employ mathematical games as assessment tools. These differ from tests and written assignments, as they offer a playful approach to mathematical content, serving as a precursor and preparation for formal evaluation. In addition

to making the process more engaging, they allow students to apply mathematical concepts in a natural and relaxed manner.

There are also other forms of intervention that teachers may implement, such as rubrics, which consist of notes made by teachers in students' notebooks to record completed tasks and acknowledge students' performance in response to assigned activities. Typically, the teacher signs with a distinctive signature to prevent replication. This assessment tool can be used on a daily basis, depending on the activities conducted in class, serving also as a means of encouragement and recognition of students' effort.

Mind maps, as mentioned by the teachers, are assessment tools in mathematics that offer a different approach to that of games. This is because they are visual tools that allow for the organization of ideas, concepts, or complex thoughts in a creative manner. The development of conceptual maps requires students to engage in the reasoning necessary to organize mathematical ideas and concepts in a clear and easy to understand way.

As for the Bimonthly Assessments, these are evaluations administered at the end of each two-month term of the academic year. They are prepared by the teacher based on the content covered throughout the respective bimonthly period. It is important to note that the academic year is divided into four bimesters, and for each of them, the student receives a grade in each subject, recorded on a report card..

Thus, the bimonthly assessment contributes to a portion of the student's overall grade. Typically administered without consultation, this evaluation consists of objective and/or subjective questions that require students to demonstrate the skills developed over the course of the bimester. Its main distinction from regular tests lies in its broader scope, as it aims to measure the student's progress over a longer period, generally two months.

The variety of instruments reported highlights the teachers' effort to provide diverse means of expressing knowledge, allowing students to demonstrate their skills in a fairer and more effective manner. As noted by Teacher 02, when asked about the most commonly used assessment instruments, she listed them as follows: "The instruments I use are: rubrics, tests, assignments, and mind maps."

Another emerging category was that of *Assessment Methods*, which includes individual and group assignments. *Individual assignments* are carried out based on specific guidelines provided by the teacher, with the aim of evaluating the student's knowledge and autonomy in problem-solving. These assignments may involve research, questionnaires, written or oral production, mind maps, among others. *Group assignments, in turn, promote collaboration among peers, enhancing performance and encouraging socialization and cooperation. This methodology allows for a greater variety of instruments to be used, such as seminars, role-playing, research projects, oral or written presentations, and tests.*

Both methods mentioned by the teachers are used to assign partial grades, which contribute to the student's final average, reflecting their performance throughout the learning process.

In regard to the category concerning the difficulties faced by teachers in applying different assessment methods, it was found that teachers acknowledge the existence of challenges in implementing diverse evaluation methodologies. However, they also emphasize that continuous effort, combined with teacher training and a commitment to student development, contributes to overcoming these difficulties and strengthens the interactive relationship between teachers and students. In this regard, Teacher 02 states:

> "I always strive to assess them not only in terms of content mastery but also in their ability to apply it. For this reason, I frequently use games and rubrics as forms of assessment. It is worth noting that teacher development in the assessment process, particularly what is necessary, is always a challenge for us educators."

It is therefore confirmed that using differentiated methods to assess Mathematics may seem challenging, but it is undoubtedly necessary. Making the assessment process dynamic requires experience, study, and dedication on the part of the teacher, since knowledge is in constant evolution, just like the students who seek it. The educator needs to be quick to evolve in their practice, not only in the act of teaching but also in the process of assessment.

As a categorical element for analyzing students' difficulties and abilities, two particularly relevant aspects were cited*: Mapping and enhancing students' skills and difficulties throughout the school year* and *Mapping and improving the teacher's work plan.* Regarding the first aspect, it is important to emphasize the verb *"enhance"*, which implies the act of improving or perfecting. In this sense, after identifying students' difficulties and skills, teachers aim to further develop the abilities already acquired, making them more robust, while also working to address the identified challenges.

The second point refers to the practice of starting from students' prior knowledge and, taking their limitations into account, organizing the teacher's pedagogical approach accordingly. In this context, the observed skills and difficulties serve as the foundation for structuring the teacher's work plan, as highlighted by the research participants:

> Yes. Through diagnostic assessment, we are able to analyze the students' skill levels and difficulties, which allows us to map these challenges and work on improvement throughout the school year. (Professor 01)

> Yes. In state schools we use assessments provided by the Department of Education, and we implement six hours of weekly clases using games (basic mathematics) with the aim of assessing my students in order to organize my course plan accordingly. (Professor 02)

An interesting topic that emerged from the teachers' responses is the fact that all of them also assess their students based on behavior and participation during class. It is important to note the subjectivity of this approach, as, when evaluating these aspects, the teacher moves away from assigning a fixed number of points as would be done for a test or assignment, relying more on personal impressions. However, behavior is inherently subjective, and each individual may have a different perception of it.

The same applies to student participation during class. It can be interpreted that, through this practice, students who do not interact with the teacher and peers may be perceived as not fully understanding the content being discussed. Therefore, it is essential that the teacher establish clear criteria when using such methodologies, which involve a degree of subjectivity, to avoid disadvantaging less communicative or shy students.

Shyness can be a normal personality trait and may stem from factors such as fear of judgment, lack of confidence, negative experiences, personality characteristics, or underdeveloped social skills, among others. In this sense, it is important for the teacher to know their students in order to identify those who are shy, so as not to demand skills they have not yet developed. For these students, alternative methodologies can be applied, allowing them to express their knowledge in a more comfortable and less stressful manner.

In this section, we identified the assessment practices employed by high school mathematics teachers, in light of their views and perceptions regarding types, methods, and assessment instruments. We also observed the difficulties these teachers face in applying differentiated methods within the assessment process. Nevertheless, whenever possible, they strive to implement new methodologies in order to diversify their repertoire with respect to assessment practices.

5 Final Considerations

This study investigated how the assessment practices of high school mathematics teachers in the municipality of Rodrigues Alves (Acre) are consolidated, as well as their implications. The aim was to understand the types, methods, and assessment instruments used by teachers, and how these are applied in their teaching practice. To this end, a case study was conducted through bibliographic, documentary, and field research, including the application of questionnaires to mathematics teachers at a public high school in Rodrigues Alves (Acre).

Overall, the objective was broken down into three specific goals. The first was to discuss student learning assessment in the discipline of Mathematics within the context of High School, seeking to answer the research question: "What elements guide the discussion on learning assessment in the context of High School mathematics?" This question was addressed through the analysis of national, state, and institutional normative educational documents, such as the LDB, the BNCC, specific resolutions from the State Education Council of Acre (CEE/AC), the school's Pedagogical Political Project (PPP), and the teacher's Didactic Sequence (DS). These documents emphasize the importance of assessment as a continuous, formative, and diagnostic process that must be aligned with students' needs and educational objectives.

Therefore, assessment is emphasized for its dynamic and constructive nature, with the argument that it should diagnose difficulties and guide pedagogical interventions. This reinforces the notion of assessment as a tool for autonomy, enabling teachers to better understand their students and personalize instruction.

It is also highlighted that assessment goes beyond the mere assignment of grades, functioning as a reflective process on learning. Assessment is considered a continuous process that supports both students and teachers. Furthermore, the importance of diagnostic assessment is underscored, as it helps identify learning gaps and promote academic recovery. In this way, we reinforce the idea that assessment should be a formative, inclusive process aimed at the holistic development of students.

The second specific objective was to identify the assessment practices employed by high school mathematics teachers in a school in the municipality of Rodrigues Alves. It sought to answer the research question: "How do high school mathematics teachers assess students in a school in the municipality of Rodrigues Alves?" Based on the collected data during the study, it was possible to observe that the assessment practices of these teachers involve various types, methods, and instruments of evaluation. The types identified include diagnostic assessment, applied at the beginning of the academic year or the introduction of new content to verify students' prior knowledge and difficulties, as well as assessments from the education system, sent by the Department of Education to measure student performance in relation to the expected learning outcomes for each stage.

With regard to assessment instruments, teachers employ a variety of tools, such as written and oral tests, bimonthly assessments, mathematical games, mind maps, and rubrics to record student performance. In terms of assessment methods, individual assignments—which promote student autonomy and group assignments, which encourage cooperation and

collaborative learning. Despite the challenges in diversifying their assessment strategies, teachers acknowledge the importance of adopting different approaches to make the process more inclusive and effective.

The third specific objective was to analyze the assessment processes used in high school mathematics in Rodrigues Alves, critically listing the effects of the commonly employed assessment methods, in order to address the research question: "What are the critical perceptions and effects of the assessment methods used in high school mathematics in Rodrigues Alves?" This objective and research question were addressed in conjunction with the second specific objective, as the identification of methods and instruments used by the teachers was accompanied by a critical analysis of them. It became clear that, beyond the objective elements and tools of assessment,composed of items that measure learning, there is also a subjective component, based on students' behavior and participation. This diverges from the traditional and formal modes of assessment typically associated with mathematics as a subject.

The analyzed practices address the research question, "In what ways do assessment practices occur, and what are their implications, among mathematics teachers in Rodrigues Alves (Acre)?" by revealing that student assessment in this subject is carried out through a variety of flexible and diversified instruments. The study showed that teachers strive to balance traditional and innovative methods to diagnose difficulties and monitor student development, even while facing challenges in applying differentiated strategies. The implications of these practices indicate that assessment goes beyond the mere attribution of grades, assuming an essential role in guiding pedagogical interventions and adapting instruction to meet students' needs.

Although this study has provided important contributions to the understanding of assessment practices in the teaching of Mathematics at the secondary level in the urban area of the municipality of Rodrigues Alves, it is necessary to acknowledge certain methodological limitations. The small number of participants—only two teachers—is due to the fact that there is only one secondary school in the urban area of the municipality, which limits the generalizability of the results. Furthermore, data collection relied exclusively on self-administered questionnaires, a method susceptible to perceptual biases and possible omissions. The inability to conduct direct classroom observations constituted another limitation, as it prevented a contextualized analysis of pedagogical practices. These findings suggest the need for further research that expands the sample size and adopts complementary methodological approaches.

Based on the preceding discussion, it becomes clear that the assessment of student learning in Mathematics at the secondary level plays a significant role in the teaching and learning process. Therefore, further research on the subject is necessary in order to deepen our understanding of how this process takes place and what its implications are for education.

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