

participation



Formative Assessment as an Emergence of the Subject and their Subjectivity¹

La Evaluación Formativa como Emergencia del Sujeto y su Subjetividad

A Avaliação Formativa como Emergência do Sujeito e sua Subjetividade

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Abstract

Assessment is a current research topic, not because it is new, but because several problems still persist in assessment practices. Among these, summative assessment predominates, characterized by the administration of examinations aimed at measuring and classifying students through numerical data. Faced with this situation, there is a need to seek new forms of assessment that position the student as the central axis of evaluation, granting them a protagonist role in their formative process. For this reason, a qualitative methodology was adopted using the case study method with the objective of proposing assessment alternatives that

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consider students and their subjectivity. Based on the research findings, it is noteworthy that strategies such as the Tic Tac Toc game, the surprise turn, the traveling envelope challenge, my learning journey, the mathematical forum, the unfair game, and my learning mirror foster formative feedback processes through self-assessment and co-assessment, by creating spaces where students have the opportunity to reflect, express their thoughts, feelings, strengths, difficulties, and errors, while advancing in the construction of their subjectivities.

Keywords: Subject, subjectivity, formative assessment, formative feedback, mathematics education.

Resumen

La evaluación es un tema de investigación vigente, no porque sea nuevo, sino porque persisten varios problemas en las prácticas evaluativas. Entre estos, predomina la evaluación sumativa, caracterizada por la aplicación de exámenes orientados a medir y clasificar a los estudiantes mediante datos numéricos. Ante esta situación, surge la necesidad de buscar nuevas formas de evaluación que posicionen al estudiante como eje central del proceso, otorgándole un rol protagónico en su formación. Por esta razón, se adoptó una metodología cualitativa con el método de estudio de caso, con el objetivo de proponer alternativas evaluativas que consideren al estudiante y su subjetividad. A partir de los hallazgos de la investigación, cabe destacar que estrategias como el Tic Tac Toc, el turno sorpresa, el reto del sobre viajero, mi recorrido de aprendizaje, el foro matemático, el juego injusto y mi espejo de aprendizaje favorecen procesos de retroalimentación formativa a través de la autoevaluación y la coevaluación,

al crear espacios donde los estudiantes tienen la oportunidad de reflexionar, expresar sus pensamientos, sentimientos, fortalezas, dificultades y errores, mientras avanzan en la construcción de sus subjetividades.

Palabras clave: Sujeto, subjetividad, evaluación formativa, retroalimentación formativa, educación matemática

Resumo

A avaliação é um tema de pesquisa vigente, não por ser novo, mas porque persistem vários problemas nas práticas avaliativas. Entre estes, predomina a avaliação somativa, caracterizada pela aplicação de exames orientados a medir e classificar os estudantes mediante dados numéricos. Diante dessa situação, surge a necessidade de buscar novas formas de avaliação que posicionem o estudante como eixo central do processo, outorgando-lhe um papel protagonista em sua formação. Por essa razão, adotou-se uma metodologia qualitativa com o método de estudo de caso, com o objetivo de propor alternativas avaliativas que considerem o estudante e sua subjetividade. A partir dos achados da pesquisa, cabe destacar que estratégias como o Tic Tac Toc, a vez surpresa, o desafio do envelope viajante, minha jornada de aprendizagem, o fórum matemático, o jogo injusto e meu espelho de aprendizagem favorecem processos de retroalimentação formativa por meio da autoavaliação e da coavaliação, ao criar espaços onde os estudantes têm a oportunidade de refletir, expressar seus pensamentos, sentimentos, forças, dificuldades e erros, enquanto avançam na construção de suas subjetividades.

Palavras-chave: Sujeito, subjetividade, avaliação formativa, retroalimentação formativa, educação matemática

Introduction

Currently, assessment whose purpose is to measure and classify students predominates. This traditional conception typically does not recognize or value the ways in which student constitutes themselves through their experiences, feelings, contexts, and relationships with others. Furthermore, this type of assessment does not provide formative feedback that allows students to become aware of their achievements, progress, and difficulties, nor does it clarify what they should do to improve and advance in their learning processes. Consequently, as Curcu (2008) points out, this way of situating assessment is determined by “an ahistorical and mechanistic conception of the educational process, in which the subject of the process, the human being who produces and receives it, is lost from view” (p. 209).

In response to this situation, the importance of shifting assessment processes is highlighted so that they are in aligned with the dynamics of today’s world, where learning is not fixed but continuously transforms (Cuda, 2024). Therefore, assessment cannot be understood as an event confined to a specific moment and space; rather, it must be positioned as an open process conducive to transformation that promotes the creation of scenarios favorable to the development of autonomy, critical reflection, and creativity.

From this perspective, formative assessment is positioned as an opportunity to rescue students’ subjectivity by fostering the creation of spaces where they feel heard, valued, and supported throughout learning processes. Seminal research by Black and Wiliam (1998) demonstrated that enhancing formative assessment practices produces significant gains in student achievement, establishing it as one of the most powerful levers for improving learning outcomes. Sadler (1989) further conceptualized formative assessment as a process in which information about the gap between the actual level of performance and the reference level is used to adjust teaching and learning, underscoring the importance of feedback that enables students to actively close that gap. In the words of Anijovich (2017), formative assessment is “an opportunity for the student to put their knowledge into play, make their achievements visible, learn to recognize their weaknesses and strengths, and improve their learning” (p. 32). Likewise, the author states that formative assessment brings numerous benefits to learning, teaching, and assessment processes, among which the following stand out: the active role assumed by students in their learning processes; the development of metacognitive skills as students reflect on what they know, how they are progressing, what their strengths and weaknesses are, and what strategies to use to advance, among other aspects; the transparency of assessment criteria; the creation of spaces that promote dialogue between teachers and students to share ideas, opinions, and concerns; the improvement of teaching practices; and the value of formative feedback.

Therefore, there is a call to challenge traditional assessment practices that prioritize measurement and classification, in order to move toward an assessment that rescues the student as a subject through their emotions, expectations, and interests, and that takes into account their needs, learning paces, and contexts, fostering spaces

where students can speak, make mistakes, and feel comfortable expressing their feelings and concerns; while the teacher, in addition to encouraging their participation, listens to them provides formative feedback at the moment and in the manner they deem appropriate to help students advance in their learning. In this way, an environment of trust and mutual collaboration is woven that favors the construction of knowledge, as well as formation in values and principles.

From these perspectives, assessment in mathematics should be a continuous process that contributes to the development of students' skills and should not be reduced to a final product in which they are labeled as good or bad. Taking the above into account, the following question arises: How can formative assessment processes in mathematics be oriented to consider the subject and their subjectivity? For this reason, it was deemed pertinent to seek other forms of assessment that consider students as subjects who construct and re-signify learning based on their thoughts, experiences, and realities.

Literature Review

Assessment Practices in Mathematics

Assessment in mathematics is typically approach from a traditional perspective, where the teacher is the one who sets the criteria and assigns grades accordingly. Likewise, the assessment results lead to decision-making regarding student retention, promotion, and certification (Sánchez-Amaya, 2013); that is, in this context, assessment serves a measurement and classification function. On the other hand, this form of assessment does not consider qualitative aspects such as reflexivity, autonomy, attitude, or motivation (Holmos-Flores et al., 2023; Vlachopoulos & Makri, 2024).

Faced with this situation, Prieto and Contreras (2008) point out that the instrumental sense of assessment represents a restricted view, since it provides only partial knowledge of what students know, but does not provide “information regarding how they know it, why they know it, what they do not know or why they do not know it” (p. 247). Thus, assessment becomes an instrument of control that ignores the singularity of each student.

In line with the above, Sánchez-Amaya (2013) points out that assessment operates as “a tool for homogenization; for the surveillance of individuals, of institutions, of populations; for their regulation, their management, their normalization, their objectification, their control, their domination” (p. 765). Similarly, the author notes that students are subjected to the same assessment practices in which their interests, needs, contexts, and expectations are disregarded.

Under this perspective on assessment, the examination is an instrument that, in addition to measuring academic achievement, has a strong influence on the constitution of subjects and the construction of their identities (Sánchez-Amaya, 2013). In other words, the examination has a controlling function because it shapes the individuality

of subjects according to preestablished standards. These standards not only classify individuals according to their performance and behavior but also influence how they perceive themselves and relate to others.

From another perspective, authors such as Jarero et al. (2013) argue that in most cases, the examination is considered the sole means of assessment, which results in little diversification in the ways students are assessed. Likewise, the authors point out that in assessment practice greater importance is given to the final result than to learning, since the aim is to assign a score for correct answers, but not to examine whether meaningful learning has actually occurred. As a result of this situation, students resort to memorization rather than reasoning when being assessed, since teachers' assessment practices focus on the application of algorithms (D'Agostino, 2023). In this regard, Elliot (1990, as cited in Palou de Maté, 2010) states that "examinations are anti-educational because they replace the intrinsic motivation to learn for life with the motivation to learn in the short term with the sole objective of passing exams" (p. 101).

The contributions of the research conducted by Ospina (2019) on assessment indicate that there is no reflection on educational practice because assessment is conceived as a written test and the impact derived from it is not analyzed. On the other hand, examinations of great difficulty for students' level are proposed and no feedback is provided on what was assessed, as a consequence that when make errors, the student are left without knowing why they made them, preventing them from becoming aware of their mistakes, and hindering their ability to construct their own learning in a clear and effective manner.

In the same vein, Cárdenas et al. (2016) state that there is a predominant interest in assessing conceptual and procedural content, in which memory and the application of algorithms that have previously taught in class are prioritized. Regarding metacognitive content, situations are rarely proposed that invite students to reason, model, communicate, and argue their ideas (Ríos-Cuesta, 2021). In this regard, González-Pérez and Criado del Pozo (2023), through a systematic review focused on mathematics education, confirm that metacognitive and self-regulatory processes remain underrepresented in assessment practices, underscoring the urgency of incorporating formative approaches that go beyond the mere measurement of procedural knowledge. Consequently, assessment is associated with examinations or considered synonymous with grading, thus prioritizing the certification of knowledge while neglecting other extremely valuable aspects in the formation of subjects, such as contributing to the development of critical thinking, collaboration, and awareness of their learning process.

Consequently, there is a call to innovate assessment strategies and instruments that are suited to the demands of the current era, considering students' needs and contexts. In this sense, it is necessary to improve teachers' training in didactic and pedagogical domains, promoting teamwork and encouraging innovation in the way of teaching and assessing while considering the diversity of students. Additionally, it is pertinent that training spaces be generated for teachers to reflect on their practices and stay updated on research and advances made in the field of education. In this

way, awareness is raised about the importance that assessment has for the formation of critical and reflective persons, based on meaningful experiences that allow them to construct their own knowledge.

Formative Assessment and Formative Feedback: Toward the Recognition of the Subject

In the educational field, students are subjected to assessment practices that typically measure their performance and abilities through numerical scores. Faced with this situation, Saura (2016) points out that subjects constitute themselves by internalizing discourses and practices influenced by the logic of the neoliberal system, which seeks to strengthen aspects such as productivity, effectiveness, and competence. In other words, subjects configure the way they perceive themselves, their behaviors, and their relationships with others according to numbers and preestablished standards.

In line with the above, the necessity of moving toward an assessment that provides the possibility for students to recognize themselves as subjects who can construct knowledge and transform themselves based on their experiences, motivations, and relationships with others and their environment becomes evident. It is for this reason that formative assessment is positioned as an opportunity to rescue students' subjectivity by fostering the creation of spaces where they feel heard, valued, and supported in their learning processes. In this regard, Black and Wiliam (1998) established that formative assessment encompasses all activities undertaken by teachers and students that provide information to be used as feedback to modify teaching and learning activities. Likewise, Sadler (1989) argued that students need to understand the goals they are aimed for, perceive the gap between actual and desired performance, and engage in action to close that gap, making transparent assessment criteria an essential component of any formative practice.

In that sense, Gutiérrez and Torres (2018) state that formative assessment is indispensable in mathematics because it fosters a collaborative environment where students feel more confident to participate and express their concerns, which leads to greater motivation and commitment to their learning processes. Likewise, the authors point out that making the criteria for self-assessment explicit facilitates students' recognition of its importance, as well as enabling them to make visible their progress, their difficulties, and the strategies they need to improve. In the same way, Valdez et al. (2023) point out the importance of formative assessment because it favors dialogue between the teacher and students, but more importantly:

[...] the person, the process, the result, the task, and the content are considered in its application; furthermore, it motivates students when applied in a reflexive and effective manner, which gives it significant value and enormous possibilities for improvement in the capabilities of the subjects who receive feedback. (p. 16)

From this perspective, the student, rather than being a receiver of information, is recognized as a subject capable of redirecting and readjusting their learning. Anijovich (2019) states that formative assessment “recognizes what is particular, unique, and diverse in each student, favoring the development of metacognitive processes” (p. 24). These metacognitive benefits have been further explored by Nicol and Macfarlane-Dick (2006), who propose seven principles of good feedback practice that promote self-regulated learning, including helping students develop their capacity for self-assessment, encouraging dialogue around learning, and providing opportunities to act on feedback. In a complementary fashion, Wiliam (2011) identifies five key strategies of formative assessment—clarifying learning intentions, engineering classroom discussions, providing feedback that moves learning forward, activating students as instructional resources for one another, and promoting student ownership of learning—which together support the development of autonomous and reflective learners. In line with this, Moreno and Moreno (2024) highlight formative assessment as an opportunity to enhance the levels of learning achieved in mathematics by applying “feedback processes, such as the identification of achievements, self-assessment and co-assessment, through which the student is recognized as the main actor in their learning process” (p. 154), which allowing students not only to master certain disciplinary content, but also in developing skills that they can use in their lives, such as: problem-solving, creativity, critical thinking, collaboration, and self-regulation.

However, the authors state that in some contexts formative assessment is applied partially or unsystematically, privileging assessment oriented toward the measurement of knowledge. Despite the recognition of the importance of using formative assessment and particularly formative feedback, there is a need to more firmly ground how to implement formative assessment strategies in mathematics. The lack of theoretical knowledge, the lack of resources (didactic materials, time for reflection and feedback, among others), scarce teacher training, in addition to the few references and experiences in formative assessment that teachers have to draw on, contribute to generating uncertainty about how to implement this type of assessment in the classroom (Gutiérrez & Torres, 2018). The foregoing can lead teachers to continue using traditional assessment methods, which tend to make invisible the different ways in which students express their ideas and demonstrate their capabilities.

Thus, it is emphasized that assessment cannot reduce students to a numerical value but rather must transcend the verification of knowledge to foster the creation of scenarios that promote the development of autonomy, critical reflection, and creativity. To this end, assessment must give students a protagonist role in their learning processes and recognize them as subjects who have the capacity to construct meaning, re-signify knowledge, generate resistances, and transform themselves and their contexts. From this perspective, “assessment always represents possibility” (Curcu, 2008, p. 210) because it opens space to the unexpected, the novel, and the singular.

Based on what has been exposed, it is considered that the implementation of assessment in mathematics that respects students’ learning paces, and is interested in knowing not only what each student has learned, but also their

interests, expectations, difficulties, and achievements, can be a path that enriches interactions and reflections within the classroom. For this reason, the objective of this study was to contribute proposals for formative assessment that considered the subject and their subjectivity.

Method

The research was framed within a qualitative typology with a sociocritical approach, given the need to understand how students experience and construct their learning processes within the framework of formative assessment, which is why it was relevant to understand their contexts, ideas, and lived experiences; aspects that could not be adequately addressed from a quantitative perspective. The design chosen was the case study because it allows for describing and analyzing in detail a phenomenon within its real context. In relation to assessment in mathematics, the case study enabled a contextualized exploration of how assessment processes are carried out and their influence on students' formation. In that sense, we aligned ourselves with what Stake (1999) affirms, who states that the case study is useful for identifying the perceptions and experiences of the subjects involved, which is why it was possible to incorporate the voices of students to have a better understanding of the impact of assessment on teaching and learning processes.

Data Collection Instruments

The instruments used to obtain information were interviews directed at teachers and students, as well as the design and implementation of formative assessment and feedback strategies.

Participants

The research was conducted in an educational institution in Calarcá, Quindío. For the interviews, work was carried out with fifth-grade students and eight eighth-grade students in order to know different perspectives on assessment. Likewise, three mathematics teachers participated in the interviews. In relation to the implementation of assessment strategies and formative feedback instruments, work was done exclusively with fifth-grade students, which comprised seven girls and nine boys whose ages ranged between 10 and 11 years. This choice was due to the fact that the principal researcher was the titular mathematics teacher at the primary school, which facilitated the development of assessment strategies in relation to the topics that were being covered.

Procedure

The research was developed in five phases: in the first phase, a bibliographic review of the antecedents of learning assessment in mathematics was conducted, in which different assessment strategies and formative feedback instruments were explored in depth; in the second phase, interviews were designed and administered to fifth- and eighth-grade students of the educational institution under study, in order to know their perceptions regarding assessment in mathematics, and also to teachers to understand their assessment and feedback practices; in the third phase, assessment strategies and formative feedback instruments were designed; in the fourth phase, some of the designed assessment strategies and formative feedback instruments were implemented; and in the fifth phase, the information gathered at different moments was analyzed and the most relevant conclusions were described taking into account the purpose of the research and the impact of the proposed formative assessment strategies as the emergence of the subject and their subjectivity.

Data Analysis

A review and analysis of different documents and articles on assessment and formative feedback processes in mathematics was conducted. Additionally, the systematization and analysis of the responses given by teachers and students in the interviews was carried out through Microsoft Excel, in order to organize the information and obtain the most relevant perceptions regarding assessment practices in mathematics. Likewise, the analysis of the implementation of assessment strategies and formative feedback instruments was conducted by observing of students' performance during their application. These observations were recorded in a field journal and were complemented with the information that students provided orally or in writing through the same strategies, which allowed the researchers to identify their effectiveness, as well as knowing students' perception of them.

Analysis and Results

Below, the analysis of the information provided in the interviews by fifth- and eighth-grade students, as well as by teachers regarding assessment practices and feedback processes in mathematics. Furthermore, a description and analysis of the implementation of assessment strategies and formative feedback instruments for the recognition of students' subjectivity is provided.

Analysis of Interviews Conducted with Fifth- and Eighth-Grade Students

Interviews were conducted with fifth-grade students and eight eighth-grade students in order to understand their perceptions regarding assessment in mathematics. The interview questions were: What do you think assessment is useful for? What do you feel when you hear the word “assessment”? Do you feel that assessments reflect what you really know about mathematics? What emotions do you feel when you are assessed? How are you assessed in mathematics class? What happens when you make mistakes in assessment? What aspects would you like teachers to consider when assessing mathematics? How would you like to be assessed in mathematics?

Most students expressed that in mathematics assessment practices, assessment characterized by the application of written tests that measure “how much they know or do not know” prevails. In turn, they state that they felt worried at the moment of being assessed because they perceive that what matters to their teachers and families are grades. The following are some of the responses given by the students:

Student 3 (5th grade): Well, I feel nervous and afraid of failing the exam.

Student 2 (8th grade): Fear and anxiety because after all I always want to achieve a good score which I do not always achieve, but well, we go on.

Student 7 (8th grade): I get nervous and frustrated because sometimes one does not understand, you get blocked and when one tries and tries, sometimes one fails.

Nevertheless, some students—especially those in fifth grade—stated that on occasion teachers use other assessment alternatives such as games, interactive activities, and board presentations with which they feel they can participate and interact with their peers.

Analysis of Interviews Conducted with Teachers

Interviews were conducted with three mathematics teachers to understand their assessment and feedback practices. The questions were: What is assessment for you? What is assessment useful for? In what way do you assess students? What aspects do you consider when assessing your students? Who conducts the assessment? Do you consider that this way of assessing reflects what students really know and understand in mathematics? Why? When your students make mistakes in assessments, do you provide them with feedback? Do you consider that assessment influences students’ emotions? When do you assess students? In what other ways do you consider that assessment could be conducted in mathematics?

The teachers expressed that for them assessment is:

Teacher 1: As a way of measuring the knowledge that I observe in students.

Teacher 2: The part of verifying the knowledge acquired or whether students have retained the information about the class.

Teacher 3: As the instrument, a way for the teacher to validate that knowledge learned in the classroom.

The foregoing is related to summative assessment, which is characterized by being conducted at the end of a topic or period with the purpose of making decisions to fail, pass, and promote students.

On the other hand, the teachers expressed that in their assessment practices they not only make use of written tests, but also of worksheets, exercises with different levels of difficulty, and when the topic allows, activities where students can apply mathematical concepts in a concrete manner. Furthermore, the three teachers pointed out that they are aware that examinations can generate pressure and anxiety in students, which is why they consider aspects such as interest, effort, and class participation.

Analysis of the Implementation of Some Assessment Strategies and Formative Feedback Instruments

Below is the description of the process of implementing the assessment strategies and formative assessment instruments proposed to evaluate students' learning processes considering their subjectivity. It is noteworthy that the strategies were organized around the topic of fractions. One of the strategies used to explore students' prior knowledge and expectations about the topic of fractions was Tic Tac Toc. To implement it, a circle was made while one of the students said aloud tic, tac, ..., toc. Each time "tic" was said, the ball was passed to the right; when "tac" was said, it was passed to the left. When "toc" was said, the student holding the ball answered a question related to the topic, which was selected by spinning a digital spinner.

Based on the responses given by students during the game of the game, it was observed that most had a basic understanding of fractions since they could represent them verbally, in writing, and graphically. However, it became evident that some students had difficulties defining what a fraction was, as well as in identifying the numerator and denominator. Furthermore, it was perceived that many did not remember what it meant for a fraction to be equivalent to another, nor how to compare fractions. For this reason, the decision was made to begin with a review of basic concepts and then work on more complex topics such as equivalences, comparisons, and operations with fractions. It is noteworthy that the strategy included metacognitive questions such as What do you expect to learn or understand better about the topic? and What do you think will be difficult for you? Based on the students' responses, it was observed that students were not accustomed to answering them, which is why it was difficult for them to express their thoughts. Faced with this situation, they were spoken to about the importance of reflecting not only on what they are learning or what achievements and difficulties they have, but also on how they feel. In this sense, it is highlighted that students enjoyed this strategy because it integrated aspects such as playful activities and the opportunity to express their thoughts without feeling the pressure of making mistakes, which created a safe and motivating space for participation.

During the development of the topic of fractions, a strategy called Surprise Turn was implemented through the Online Stopwatch platform, which consisted of spinning a digital wheel with students' names to determine who would participate in classes by

answering questions to know both their opinions and feelings, as well as what aspects they were understanding and in which ones they were presenting difficulty in order to provide feedback. Furthermore, this strategy was used to discuss students' responses to the exercises being performed and validate them with the rest of their classmates and with the teacher.

In general, students were attentive and motivated by the use of this strategy. However, there were moments when some did not want to participate because they were embarrassed or because afraid of making mistakes, so efforts were made to create a climate of trust in the classroom, expressing to them that mistakes are part of life itself and therefore are present in the learning process. In the same way, efforts were made to provide security to students and encourage them to participate at all times. As a result, dialogues were generated that gave way for the validation of responses with classmates and with the teacher, as well as awareness on the part of students regarding their understanding, progress, and difficulties regarding the concepts addressed.

Thus, it is highlighted that the Surprise Turn strategy aroused students' curiosity because they were eager to see would be chosen randomly. Furthermore, it promoted the participation of all students, encouraged listening and respect for others' ideas, and opened spaces to conduct feedback.

Another of the strategies implemented during the development of the topics was The Traveling Envelope Challenge, which was based on a mystery of a sealed chest that students had to open. To do so, they had to solve in groups the mathematical challenges contained in four envelopes related to fractions and they had ten minutes for each one. It is noteworthy that when the time was up, they had to pass the envelope to the group on the right. This process was repeated until all groups had solved the mathematical challenges of the four envelopes.

During the development of the activity, it was observed that groups 1, 2, and 4 worked collaboratively manner as they shared ideas, explained concepts to one another, and provided support when they saw that someone did not understand how to solve the exercises. However, it was observed that in group 3 there was no communication and each student worked independently. In response, a conversation was held with them, and they were reminded of the importance of working in teams to exchange and know new ideas, supporting classmates who experienced difficulties, and thus be able to solve the mathematical challenges more effectively.

When all groups finished solving the activities in the four envelopes, they were asked to enter their answers into a Google Sheets spreadsheet to determine if they had met the objective of opening the chest. It is noteworthy that groups 1 and 4 managed to successfully solve each of the mathematical challenges proposed in each envelope, whereas groups 2 and 3 only managed to complete three of them. To value the effort and good disposition of students in the development of the activity, they were given a small token.

To complement the dynamics of the Traveling Envelope Challenge, students were provided with a rubric with the objective to conduct a self-assessment of the work performed at both the individual and group levels. Heritage (2010) points out that such instruments, when used formatively, allow teachers to interpret evidence of student

learning in real time and make pedagogical decisions that help narrow the gap between current performance and learning goals. It is notable that this instrument aroused students' interest since they were not familiar with it. For this reason, a space was opened to explain what a rubric was, what it was used for, and how they should complete it. Furthermore, emphasis continued to be placed on the importance of reflecting on the following aspects: how they were progressing in their learning processes, what they had learned, how they had felt, and what aspects they would like to change or improve. Below, Figure 1 presents an example of a rubric completed by a student together with the teacher's feedback:

Figure 1.

Rubric completed by student 9

Criterios	Logrado	Avanzado	En camino	A revisar
Trabajo en equipo	Participé activamente en todos los retos matemáticos. Además, colaboré aportando mis ideas de manera clara y escuchando con respeto las de mis compañeros.	Participé en la mayoría de los retos matemáticos. Aunque colaboré, a veces interrumpí o no escuche a mis compañeros.	Participé en algunos retos matemáticos. Casi no aporté ideas y con frecuencia no preste atención a mis compañeros.	Casi no participé, no colaboré y tampoco escuché los aportes de mis compañeros con respeto.
Resolución de los desafíos	Aporté soluciones correctas en todos los retos matemáticos y expliqué mis pensamientos de manera clara.	Aporté algunas soluciones correctas dando explicaciones claras.	Aporté algunas soluciones, pero con errores y mis explicaciones fueron confusas.	No aporté soluciones correctas y tampoco fui capaz de explicar mis pensamientos.
Manejo del tiempo	Completé los retos matemáticos de cada sobre dentro del tiempo asignado sin apresurarme.	Completé la mayoría de los retos matemáticos de cada sobre a tiempo, pero en algunos casos de manera apresurada.	Complete pocos retos matemáticos dentro del tiempo asignado, aunque trabaje de manera constante.	No complete los retos matemáticos y no gestione bien el tiempo.
Reflexión final	Puedo explicar lo que aprendí y cómo se resolvió cada desafío.	Identifico algunas cosas que aprendí durante la actividad y soy capaz de explicar cómo se resolvieron los desafíos.	Me cuesta explicar lo que aprendí o cómo trabajamos.	No logro expresar lo que aprendí en la actividad.
Comentarios (sentimientos, aspectos por mejorar, dificultades o sugerencias): la actividad es tubo muy chevere y me iso ver que e aprendido mucho				
Retroalimentación del docente: Quiero felicitarte porque se nota que te has esforzado por aprender y has sido responsable con la realización de las actividades propuestas. Te animo a continuar con esa misma actitud para seguir aprendiendo y alcanzar tus metas.				

Note. Prepared by the author.

Based on the responses provided in the rubrics, it became evident that the activity was of students' liking since they expressed that it was fun, they had the opportunity to express their thoughts, they felt that they learned, they showed how appropriately they understood the topics, they became aware of the difficulties they had and what aspects they should reinforce. Furthermore, they stated that they would like to continue using the same activity for future topics. However, some suggested giving more time to solve the mathematical challenges contained in the envelopes. Regarding the topics that were assessed, it was observed that most students showed significant progress in graphic representation and in the processes of amplification and simplification. However, some students still had difficulties when placing fractions on the number line and comparing them, so a reinforcement was done in class before moving on to the next topic.

As part of the process, a strategy called My Learning Journey was also implemented, which consisted of a reflection journal in which students wrote as a form of self-assessment about their thoughts, experiences, understandings, achievements, difficulties, and emotions throughout the classes. In this sense, each student was provided with a notebook constructed with cardboard and block paper so that they could decorate it to their liking. It is worth noting that, following the suggestion of Keeley and Tobey (2011), on the first page of the journal a photocopy containing a set of questions was pasted to facilitate the development of reflections. In Figure 2, the covers elaborated by each of the sixteen students are presented:

Figure 2.
Reflection Journals of the Sixteen Students



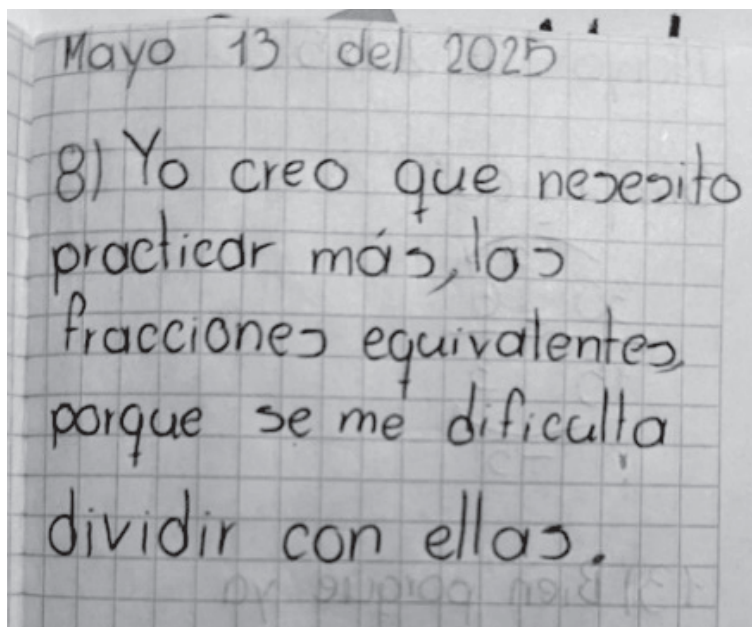
Note. Prepared by the author.

Students liked the idea of using a journal as part of the learning and assessment processes, since they had never had a space in mathematics class where they could reflect. For this reason, when delivering the journals, an explanation was given about what they consisted of, what their purpose was, and how they would to be used; furthermore, special emphasis was made that the journals were for personal use in which each one could express themselves freely without fear of being judged.

It is important to note that the journal was used once a week. To do this, a moment was given in one of the classes in which students had to answer the selected question. In this way, they reflected not only on what they had learned, but also on how they felt, the difficulties they had experienced, what topics they would like to reinforce, among other important aspects. To exemplify the above, Figure 3 shows the response of a student to the question: What topic do you think you need to practice more?

Figure 3.

Response given by student 2

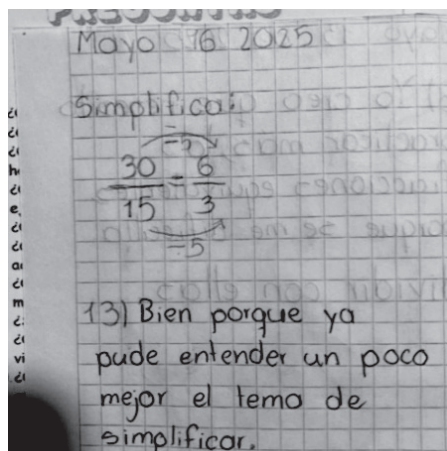


Note. *Prepared by the author.*

In one of the journals reviews, it became evident that most students reported having difficulties with the topic of equivalent fractions, specifically at the moment of performing the simplification process because they did not know how to determine the number by which they should divide both the numerator and the denominator. For this reason, a review of divisibility rules was conducted through examples and exercises with the Surprise Turn strategy with the objective of students achieving understanding and gaining confidence when simplifying fractions. Subsequently, an exercise was proposed for each student to solve in their journal and then answer the question: How did you feel during today's class or activity? To assess whether confusion still persisted or whether participants had achieved better comprehension of the topic, as illustrated in Figure 4.

Figure 4.

Response given by student 2



Note. *Prepared by the author.*

It is noteworthy that most students reported feeling happy because they understood better how to simplify fractions. However, there were two students who expressed feeling sad because they still did not understand the topic, so a conversation was held with them to know the reason why they were not able to understand and to look at what strategies to use to help them overcome the difficulties they had. Another of the strategies implemented with students during the development of the topics was The Mathematical Forum, which had the purpose of generating a space in which students had the opportunity to communicate their ideas, dialogue with both their classmates and the teacher, and receive formative feedback. It is noteworthy that, for the implementation of the forum, students were given the freedom to present the topic that corresponded to them with the help of the board, posters, slides, or with other resources that they considered pertinent.

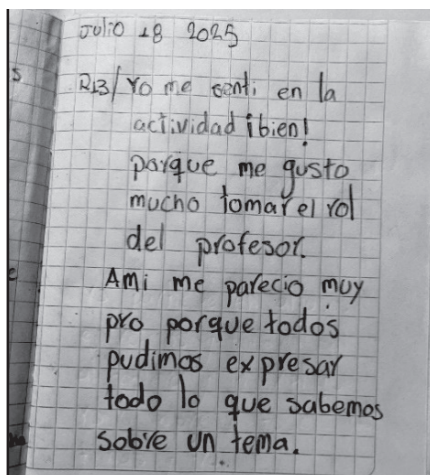
On the other hand, it was explained that the evaluation of the presentations would not be the sole responsibility of the teacher, but that students would also participate in evaluation of their classmates' work. In this sense, colored faces (green, yellow, and red) were introduced that are part of a formative feedback instrument proposed by Anijovich (2019) called a traffic light checklist. At the end of each presentation, students were instructed that they had to raise a face considering the clarity of the explanation. Furthermore, they had to argue with respect the reason for their choice, which could include recommendations, aspects to improve, or congratulations.

To know how students felt and how they found the mathematical forum activity, they were asked to write in their reflection journals about it. It is noteworthy that most students expressed that it caught their attention since not only did they take on the teacher's role to explain the topic that corresponded to their classmates, but they also had the opportunity to assume the role of evaluators, as shown in Figure 5. However,

some students stated that despite liking the forum, they felt nervous because they were embarrassed to speak in public or they were afraid of making mistakes and seeing what their classmates thought about them.

Figure 5.

Student 4's Thoughts on the Mathematical Forum



Note. *Prepared by the author.*

Another of the strategies was The Unfair Game, which was used to identify students' understandings, concerns, strengths, difficulties, and aspects that required feedback before the final test of the second period. In this dynamic, students organized themselves into two groups and by turns had to answer questions in a determined time. Each question had an assigned value that could be positive or negative, which was known only until the selected question was answered correctly.

To conduct the game, slides were projected that containing the questions and their corresponding scores, in addition to a timer so that everyone would be aware of the time. It is worth noting that, from the beginning, students showed interest in the game instructions, especially upon seeing that the team that won was not the one that made the most points, but the one that was closest to zero.

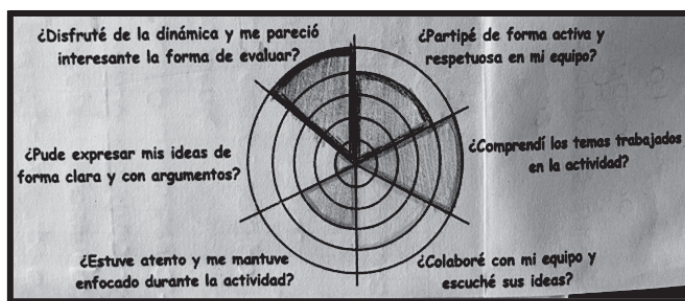
During the development of the activity, it was observed that group 2 worked collaboratively since when it was their turn, they discussed to which question to answer, who would explain it, and also to determine what to do with the score obtained when they answered correctly. Furthermore, it became evident that throughout the game all group members participated actively because they gave contributions to find the solution and listened with respect to the ideas that emerged. However, it was observed that group 1 had difficulties working in teams since at the beginning they could not agree on choosing who was going to go out to explain the questions or to decide what to do with the points obtained. Furthermore, there were group members who were not paying

attention to the work being done to solve the questions. In response, a conversation was held with students about the importance of listening with respect and valuing their classmates' ideas since they could help them better understand the concepts, discover new strategies to solve problems, or clarify any doubts they might have.

With the purpose of enriching the dynamics of the Unfair Game, students were provided with a To evaluate of the game, as well as of their work throughout it. It is noteworthy that students were not familiar with this instrument, so an explanation was given about its purpose and how it worked. Figure 6 presents, by way of example, one of the Targets completed by a student together with the justification (Figure 7) of the evaluation of each aspect in their reflection journal.

Figure 6.

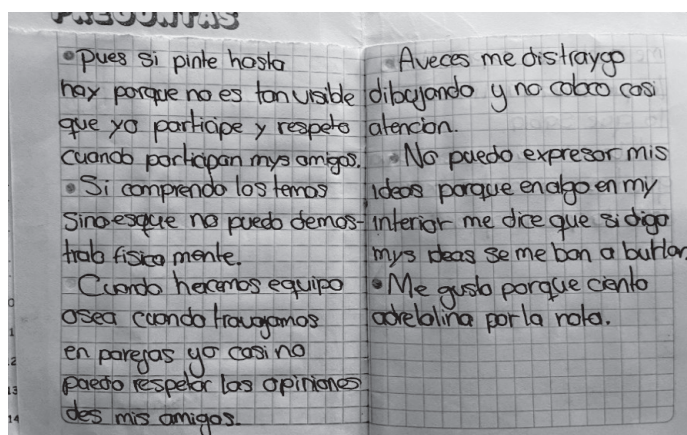
Target completed by student 13



Note. Prepared by the author.

Figure 7.

Justification for each of the aspects of the target by student 13



Note. Prepared by the author.

According to the responses provided by students in the Targets, it became evident that the game was fun and caught their attention because in addition to having a competitive dynamic, they could express their thoughts, learn about their classmates' ideas, and reinforce those topics in which they experienced difficulties. Furthermore, they expressed that they would like to participate in the same activity again.

Regarding the topics that were assessed, it is noteworthy that most students had good command of fractions. However, some still had difficulties when solving application problems and others still did not understand how to place fractions on the number line. In this regard, feedback was provided throughout the game regarding the responses that students shared in order clarify any possible doubts and questions they might have.

To conclude the topic of fractions, a strategy called My Learning Mirror was implemented, which consisted of completing a checklist with the objective that students conducted a personal reflection and self-assessment of the achievements, difficulties, and feelings they had during the development of the topic, as shown in Figure 8.

Figure 8.

Student responses in My Learning Mirror

Criterio	SI	NO	PARCIALMENTE
Entendí los temas y busqué ayuda cuando no entendí algo.	☒	☐	☐
Entregué los trabajos y actividades propuestos a tiempo.	☐	☐	☒
Me esforcé por participar y prestar atención en clase.	☐	☐	☒
Logré aprender cosas nuevas sobre este tema.	☒	☐	☐
Tuve algunas dificultades para aprender, pero me esforcé por superarlas.	☒	☐	☐

- ¿Cómo te sentiste durante el desarrollo de los temas?
R/ muy bien por que los entendí algunos seme complicados pero en general bien
- ¿Cuál fue el tema que más te gustó aprender? ¿Por qué?
R/ ubicar las fracciones en la recta, por que fue muy chero y simos muchas actividades ect.
- ¿Qué aspectos consideras que debes mejorar?
R/ en la atencion por que me distraigo mucho.

Note. Prepared by the author.

In the checklists, students stated that despite having complications in understanding certain topics, they felt good because they found the dynamics conducted during the development of the classes interesting. Furthermore, they pointed out that in general they liked the topic of fractions, especially graphic representation, placement on the number line, addition of homogeneous fractions, multiplication and division of fractions. On the other hand, it is noteworthy that there were students who considered that they did not have aspects to improve, while others expressed that they should work on responsibility, attention in class, and reinforcement of topics such as multiplication and division so as not to have difficulties in the learning process of subsequent concepts.

Discussion and Conclusions

With reference to the information found in the antecedents on assessment, it is inferred that several problems still exist in assessment practices, given that in teachers' assessment practices characteristics of an assessment oriented toward measuring and classifying are manifested, fostering memorization and reproduction of content and influencing the configuration of subjects and the construction of their identities through numerical data.

In line with the above, Ospina (2019) points out that currently in mathematics assessment characterized by summative evaluation that values the degree of correspondence between what the teacher has explained and what the student has memorized at specific moments predominate, which is why superficial and short-lived learning occurs. In this regard, Ravela et al. (2017) point out that many students become accustomed to memorizing data, dates, definitions, and formulas without understanding their meaning, so they limit themselves to studying what is necessary to pass and their main concern becomes the grade. Definitively, this perspective on assessment tends to value the final result, rather than guide and support learning, which is why it prevents the development of students' autonomy to act and transform their contexts.

Likewise, there is little variety in assessment strategies when it comes to assessing, since the instrument that teachers use the most is the examination, which is administered out at fixed moments and does not usually take into consideration students' interests, needs, contexts, or expectations. This makes it difficult to create spaces for feedback and self-assessments that foster students' awareness of what they know and how they learn, but also of who they are, how they relate to others, what their place in the world is, and how they can influence it.

Regarding the research question about how to orient formative assessment processes in mathematics that take into account the subject and their subjectivity, it is inferred from the theoretical framework, the interviews, and students' appreciations about the strategies and instruments implemented that assessment is not linear, but rather a flexible and open process to the changes that are being generated in the context. In the words of Curcu (2008):

Assessment, then, implies the rescue of the subject as a forger of paths within the framework defined by what is necessary, which contains a diversity of senses that constitute possible options of realities, which are translated into their urgency for autonomy and in their own space of life. (p. 210)

Also, from the assessment strategies and formative feedback instruments implemented, it is concluded that they increased students' interest, motivation, and participation in class, enabling them to assume a more active role and have a more human and enriching experience in assessment. More specifically, students participated in competitive activities, worked in teams, received continuous feedback, reflected on their achievements, difficulties, and areas for improvement, expressed their thoughts and feelings, learned about their classmates' ideas and opinions, and had the opportunity to assume the role of evaluators through self-assessment and co-assessment. This is particularly relevant, because as Cuda (2024) points out:

Co-assessment and self-assessment are important because they allow students to make decisions and take ownership of their own learning process, be critical of themselves, take responsibility, and know their capabilities and limitations. Both formats can, furthermore, allow the teacher to better know the achievements and difficulties that students experience during learning. (p. 103)

Thus, assessment is not about quantifying the progress achieved by students; rather, it is “a constant dialogue that is created with the other to improve oneself as a human being, as well as in learning” (Ramírez et al., 2018, p. 41). In this same line, Anijovich (2010) highlights the importance of formative feedback arguing that when it is offered systematically, they “develop a deeper metacognitive awareness and gradually become responsible for the self-regulation of their learning, which allows them to progressively constitute themselves as autonomous learners” (p. 145). These findings align with those Hattie and Timperley (2007), who demonstrated that the most effective feedback operates at three complementary levels –task, process, and self-regulation– and consistently moves students toward greater understanding and agency. Furthermore, Brookhart (2017) emphasizes that the quality of feedback depends on its timing, specificity, and positive tone, dimensions that were deliberately incorporated in the feedback provided through the rubric and the My Learning Journey journal, ensuring that students received actionable information to improve their learning processes.

Finally, a call is made to implement in the different school levels and areas of knowledge assessment strategies and formative feedback instruments that consider the subject and their subjectivity, in addition to continuing to research other forms of assessment that respond to the dynamics of today's world and favor the formation of critical and autonomous subjects based on self-assessment and co-assessment practices.

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