PRÁTICAS EDUCATIVAS, MEMÓRIAS E ORALIDADES

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Learning assessment: a didactic proposal for teacher training in chemistry

EDUCATIONAL PRODUCT

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Abstract
The aim of this paper is to present a proposal for a didactic workshop focused on the theme of learning assessment and, specifically, taking the generations of assessment as a reference. The workshop is intended for the initial training of chemistry undergraduates, using six case studies, each representing a generation of assessment practices in the context of chemistry education. By constructing and analyzing these case studies, this paper proposes a comprehensive methodological framework for teacher training, advocating an inclusive, equiBox, and contextually relevant approach to the assessment of learning. The conclusions suggest that the integration of these diverse assessment strategies into teacher training programs can better prepare educators to face contemporary challenges and promote the comprehensive development of students and teachers.
Keywords: Teaching-Learning Process. Assessment Methods. Case Study.

Avaliação da aprendizagem: uma proposta didática com vistas à formação docente em química

Resumo
Este estudo objetivou apresentar uma proposta de oficina didática centrada no tema avaliação da aprendizagem, especificamente, tomando como referência as gerações de avaliação. A oficina seria destinada à formação inicial de licenciandos em química; para tanto, foram utilizados seis estudos de caso, cada um representando uma geração de práticas de avaliação no contexto da educação em química. Ao construir e analisar esses estudos de caso, este artigo propõe um quadro metodológico abrangente para a formação de professores, defendendo uma abordagem inclusiva, equitativa e contextualmente relevante para a avaliação da aprendizagem. As conclusões sugerem que a integração dessas diversas estratégias de avaliação nos programas de formação de professores pode preparar melhor os educadores para enfrentar os desafios contemporâneos e promover o desenvolvimento integral dos estudantes e professores.
Palavras-chave: Processo de Ensino-Aprendizagem. Métodos de Avaliação. Estudo de Caso.

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1 Introduction

Teaching practice requires a range of skills and abilities from its professionals, which are developed throughout their training and intensified in supervised internships, making it possible to work and develop the teaching-learning process in a way that is potentially geared towards the full development of students. In this sense, it is worth highlighting "assessment" as one of the pedagogical elements of the teacher's training process with the aim of achieving the objectives of education, thereby mobilizing knowledge, criticality, dynamism, flexibility and empathy.

Assessment, as defined by Luckesi (2014), is a process in which one must make a quality judgment about data, being relevant data, in order to be able to make a decision based on it. Therefore, assessment runs through the entire teaching-learning process, as well as reflecting on action and practice in order to make decisions. It therefore involves constantly seeking to understand how the learning process is progressing, with the active participation of the subjects, using pertinent data and information. This understanding is used to make decisions about what and how to do to ensure that meaningful learning takes place that benefits the development of individuals (Ramos; Moraes, 2010).

In everyday school life, the act of assessment is constantly confused with the practice of examining, i.e. students are trained to solve conceptual questions used in entrance exams. According to Zabala (1998), the school is focused on selecting students, thus performing a sanctioning function by qualifying and approving, from an early age, those who have the potential to achieve academic success up to university.

At this juncture, the exam has become so prevalent in teaching practice that it has become guided by an exam pedagogy. In this respect, Luckesi (2014) states that the focus is on the promotion of students and is geared towards grades; where the test, in turn, is the main instrument used and often has the function of controlling the student/class through threat, thus influencing student behavior (Saul, 2015). Luckesi (2014) provides a good illustration of the clash between exam pedagogy and learning assessment, in which schools tend to focus on the end product of learning, a characteristic of exam pedagogy.

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However, the focus should be on the student's learning process, which is the essence of learning assessment.

In addition to Learning Assessment, Guba and Lincoln (1989) discuss the historical changes in the way the assessment process is perceived in four moments (generations), known as Assessment Generations (AG).

According to the authors, **the first generation of assessment** focused on an assessment carried out at the end of the educational process, with the aim of estimating the product of teaching by classifying, measuring, selecting and comparing performance. It is known as the Measurement Generation and is characterized by the use of standardized tests, addressing a quantitative perspective and individual assessment with the aim of classifying and comparing the subjects being assessed, i.e. the students. This is done through written and objective exams with precise and unambiguous questions (Guba; Lincoln, 1989).

The **second generation of assessment**, on the other hand, sought to characterize patterns of behavior with a view to highlighting strengths and weaknesses, using a highly quantitative approach with a tendency to present objective and direct questions according to content and by looking at programs, curricula and their contents (Guba; Lincoln, 1989). Although it has introduced new assessment tools related to content and teaching strategies, the technical and examining tradition still prevails in the development of practices, considering it as a continuous process to improve the curriculum and introducing the idea of "assessment by objectives" (Silva; Gomes, 2018; Miguel; Justina; Ferraz, 2022).

Third generation assessment would be a qualitative, procedural assessment that takes place during the teaching-learning process and uses a variety of tools to provide an overview of what happens during this process. Its scope would be to allow the evaluator to make a decision by judging the value and merit of the object being evaluated, although it would be procedural and qualitative, with the aid of various evaluation instruments. In this generation, there was a significant increase in the diversity of evaluation instruments and

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models, highlighting the importance of allowing the formulation of value judgments in relation to evaluation objects (Miguel; Justina; Ferraz, 2022).

The First, Second and Third Generation evaluation models are characterized by the adoption of an objective scientific approach in their methods, which, according to Guba and Lincoln (1989), is a limitation. These models have an excessive dependence on quantitative and objective methods, which can lead to various problems, including the neglect of the specific context in favor of the search for generalizable results. As a result, evaluations lose relevance at the local level, since they prioritize generalist factors and do not adequately address individual or contextual particularities and needs (Guba; Lincoln, 1989; Silva; Gomes, 2018).

In addition, previous generations of evaluation had an excessive emphasis on formal quantitative measurement, based on the use of statistical and mathematical tools for control and prediction. This perspective implies the assumption that only phenomena that can be measured are considered legitimate, which favors a single, inflexible view associated with the positivist paradigm (Guba; Lincoln, 1989; Lima Filho; Trompieri Filho, 2013; Silva; Gomes, 2018; Miguel; Justina; Ferraz, 2022).

The **fourth generation** would then stand out for its emphasis on negotiation and the subject's participation in the evaluation process with the aim of promoting an emancipated and autonomous subject (Guba; Lincoln, 1989).

According to Guba and Lincoln (1989), in fourth generation evaluation, claims, concerns and issues emerge from the specific perspectives and values of the different stakeholder groups. This contextual and dynamic character makes the evaluation process potentially unpredictable for those who do not belong to these groups. Although this characteristic can give evaluation an appearance of complexity and impracticality, it actually represents one of its main advantages, as it requires those involved to consider perspectives other than those they would traditionally adopt.

Recent studies have introduced two new generations of evaluation: the **Fifth**, called Social Construction, which reviews evaluation as a socially shaped process, prioritizing democratic and participatory values; the **Sixth Generation**, which focuses on

socio-emotional aspects, social policies and educational assessment, through a dialogical approach that values solidarity, responsibility and empathy(Lima Filho; Trompieri Filho, 2013; Rodrigues; Araújo, 2015; Miguel, 2021; Miguel; Justina; Ferraz, 2022).

Although the generations of evaluation are often presented sequentially, it is essential to emphasize that their evolution has not been linear and unidirectional. On the contrary, this evolution is marked by changes and clashes, since the very definition of evaluation is permeated by controversy (Guba; Lincoln, 1989). Thus, despite the distinctions between the six generations, each seeks to overcome the limitations of the previous ones, while maintaining a commitment to preserving the positive contributions of previous generations. Thus, these generations should not be understood as watertight stages, but as interconnected and complementary perspectives.

Uhmann and Vorpagel (2018) point out that, when analyzing the conceptions of teachers (in initial training, trainers and public school teachers), it can be seen that evaluation practice does not fit rigidly into a single generation. Instead, there is a combination between them, in this case the first four generations that were the focus of the research, thus revealing a certain resistance to the transition from more traditional approaches to more participatory and emancipatory ones. This phenomenon suggests that change in assessment practices occurs gradually and in a complex way, and therefore requires critical reflection and ongoing training for the professionals involved in the educational process.

It is therefore necessary to develop teaching strategies that encourage debate and learning about assessment in teacher training. With this in mind, workshops can be used as research strategies because they translate into "spaces with critical potential for negotiating meanings, allowing the visibility of arguments, positions, shifts, construction and contrast of versions" (Spink; Menegon; Medrado, 2014, p. 33). In view of this, dialogic exchanges provide visibility, construction and transparency of different interpretations of reality, which enables other possibilities and gives meaning to the issues discussed.

In view of the above, this text presents the planning of a pedagogical workshop associated with the Generations of Assessment with the aim of contributing to the initial

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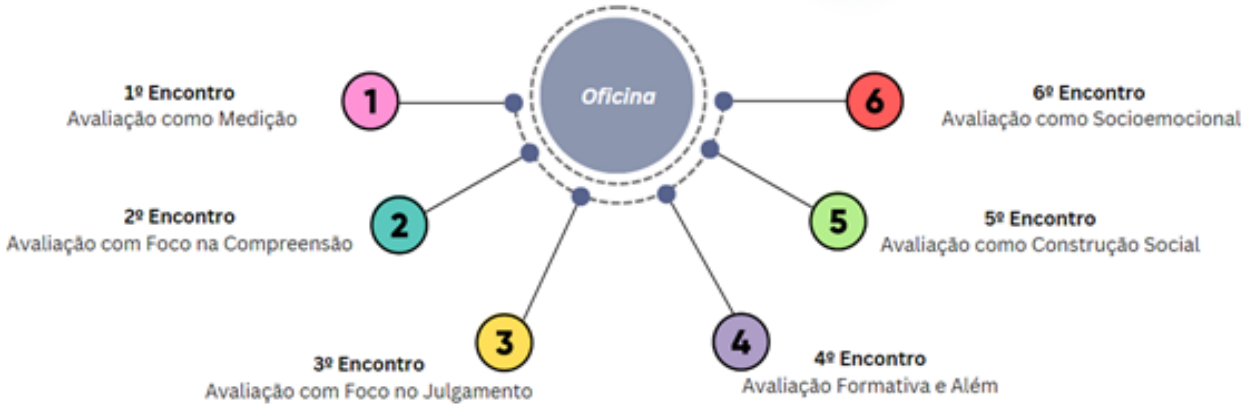
training of chemistry undergraduate students, as well as helping future teachers to understand and apply effective assessment practices in their teaching work.

2 Workshop structure

This study has its origins in a master's research conducted at the Federal University of Amazonas (Ufam), which highlights the theme of Educational Evaluation and corroborates the study by Valle and Arriada (2012, p.6), in which they state that "a workshop must take into account the articulation of concepts, assumptions and notions with concrete actions, experienced by the participant or apprentice, as well as the experience and execution of team tasks, that is, the collective construction of knowledge".

The pedagogical workshop "Improving the evaluation process in teacher training" was based on the theories of Guba and Lincoln (1989), supported by the propositions of the four Generations of Educational Evaluation (Measurement, Educational Objectives, Value Judgment and Negotiation) and expanded to cover contemporary generations (5th and 6th Generation), which focus on the perspective of social constructions and socio-emotional aspects. It is organized as follows, according to Figure 1.

Figure 1 - Overview of the workshop meetings



Source: Authors (2025)

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Figure 1 illustrates the distribution of the six meetings and represents the entire process of study, planning, articulation and development of the case studies and shows the relationship between the meeting moments and the preparatory and analytical stages of the work.

Each meeting presents an associated case study, which is developed using the observations made in the work by Sá, Francisco and Queiroz (2007), in which, for a good case study, it must: (a) have the narration of a story that should not have an end yet; (b) arouse interest in the case to be solved, which seems real, with drama and suspense; (c) have a question to be solved; (d) be current in order to awaken in the student the importance of the case; (e) have central characters; (f) include quotes aimed at empathizing with the characters; add life and drama to all the quotes so that the students know how to solve it; (g) be useful for pedagogical training; (h) provoke a conflict, with controversial points; (i) lead to a decision; (j) have a general applicability, not a specific one; (k) be short so that there is no tedious analysis.

In Box 1 below, the activities designed for a period of six meetings are described. This timeline can be adjusted by the implementing teacher, where each meeting (Enc.) will include a conceptual approach to one of the six generations of evaluation, followed by a debate and then the reading and resolution of the proposed case study. In the following text, these activities are detailed, considering a minimum duration of two hours for each meeting — approximately the length of classes held in Higher Education Institutions (HEIs).

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Box 1 – Proposed Activities in the Workshop

Meeting	Activities
1st	Presentation of the research; Reading and Resolution of Case Study 1: **"Primordial Codes: Invisible Patterns in the Forge of Evaluation"**
2nd	Reading and Resolution of Case Study 2: **"Pedagogical Resonances: On the Threshold of the Second Generation of Evaluation"**
3rd	Reading and Resolution of Case Study 3: **"Molecules of Evaluation: Narratives in the Web of Judgment"**
4th	Reading and Resolution of Case Study 4: **"Paths of Evaluation: Beyond Tests, the Chemistry of Participation"**
5th	Reading and Resolution of Case Study 5: **"Cultural Harmony in Evaluation: Unraveling the Mosaic of Diversity in Chemistry"**
6th	Reading and Resolution of Case Study 6: **"Molecular Symphony: Harmonizing Emotions in the Chemical Evaluation of Life"**

Source: Authors (2025)

1st Meeting – The first case study is set in the context of the First Generation (Measurement), understood as aimed at assessing performance, heavily influenced by psychometrics and the development of standardized tests to quantitatively measure human cognitive abilities. The goal was to classify these abilities into different levels, with no other forms of evaluation considered (Guba; Lincoln, 1989; Miguel; Justina; Ferraz, 2022).

The pre-study discussion questions for this case: 1. What is the role of tests and exams in evaluation as measurement?; 2. What are the benefits and challenges associated with this perspective?; 3. How can evaluation as measurement affect equity among students?; 4. Are there ways to mitigate potential disparities?; 5. Share a personal experience where you encountered evaluation as measurement. How did it impact your learning?

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The case presents the story of Professor Silvia, who faces a dilemma between her assessment practices and the recommendations from the educational institution where she works (Box 2).

Box 2 – Case Study 1 - Primordial Codes:
Invisible Patterns in the Forge of Evaluation

Primordial Codes: Invisible Patterns in the Forge of Evaluation

In the year 2024, assessments were a dominant feature in schools, with a strong emphasis on measuring and quantifying educational outcomes. This case study explores the impact of this approach on Chemistry teaching in a high school setting.

Harmonia State School, founded in 1985, rigorously implemented first-generation evaluation practices. The pressure to measure student knowledge led to frequent tests, exams, and assessments across all subjects.

Professor Silva, a newly hired Chemistry graduate, found herself challenged by the increasing demands for assessments — especially during her first term teaching chemical equilibrium. The environment prioritized measurable results to demonstrate teaching effectiveness.

On a particular day:

Prof. Silva: Good morning, class. Today, we'll have an assessment on the basic concepts of chemical equilibrium.

Student 1 (Augusto): Professor, why do we always need so many tests? I'm more worried about scoring points than actually learning — I feel overwhelmed.

Student 2 (Aurélio): Yeah, professor, we're doing tests and graded exercises every week. It makes me really anxious.

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Prof. Silva: I understand your concerns. The pressure comes from above to show results, but I want you to know that my goal is to ensure you truly understand chemistry concepts.

With the growing emphasis on quantitative assessment, Prof. Silva faces the dilemma of balancing the need to measure student performance with her desire to provide a rich, meaningful chemistry education. Amid external pressures for quantifiable results, how can she ensure her students develop a deep understanding of the subject — particularly chemical equilibrium?

As the dilemma escalates, Prof. Silva must make crucial decisions about adapting her teaching methods to meet evaluation demands without sacrificing learning quality. The future of education hangs in balance.

You are Chemistry teachers and friends of Silva. Your task is to help her find and propose solutions to the problem she is facing.

Source: Authors (2025).

As friends of Silvia, it is essential to emphasize the diversification of assessments, incorporating formative assessments, research projects, and practical work. This approach can help students feel less pressured by frequent tests and more motivated to engage actively in the proposed activities. Shifting the assessment format in this way fosters an environment where the primary focus is on learning and understanding concepts, rather than merely achieving grades.

The goal, in this case, is to adopt active learning methodologies that promote critical thinking, analytical skills, collaboration, problem-solving, and practical application of chemical concepts. Additionally, integrating online tools, educational platforms, and gamification elements can make learning more interactive and engaging. This approach supports flexibility in the learning process, allowing students to learn autonomously and at their own pace (Andrade; Viana, 2017).

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It is also crucial to maintain open communication with school administration to explain the importance of balancing quantitative assessment with pedagogical practices that promote meaningful learning. From this perspective, advocating for a more spaced and varied assessment schedule is key. Moreover, performance goals should include qualitative indicators such as critical thinking development, teamwork, communication skills, and other essential competencies.

By implementing these strategies, Professor Silvia can transform her dilemma into an opportunity for innovation, improving the quality of Chemistry teaching. This approach not only benefits students and the institution but also fosters a sense of belonging among students, encouraging them to engage in future teaching practices with a more holistic view of education.

2nd Meeting – The second case study focuses on the Second Generation of Evaluation, which aims to change student behavior based on educational objectives guiding the learning process, introducing new assessment tools. However, the technical and exam-focused tradition still dominates practice, framing assessment as a continuous process to improve the curriculum, while incorporating the idea of "objective-based evaluation" (Silva; Gomes, 2018; Miguel; Justina; Ferraz, 2022).

The pre-study discussion questions for this case: 1. How can Understanding-Focused Assessment contribute to developing practical skills in students? 2. Are there limitations you observe in this method compared to more traditional approaches?; 3. What types of assessment tools could be incorporated to ensure a comprehensive understanding assessment?; 4. What are the benefits and challenges associated with this approach?

For this context, Case Study 2 presents the story of Professor Oliveira, who faces a dilemma about changing student behaviors in a classroom where test culture still prevails (Box 3).

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Box 3 – Case Study 2 - Pedagogical Resonances:
On the Threshold of the Second Generation of Evaluation

Pedagogical Resonances: On the Threshold of the Second Generation of Evaluation

The shift toward the Second Generation of Educational Objectives, from the 1930s to the 1960s, brought a significant change in evaluation approaches, emphasizing program evaluation, content analysis, teaching strategies, and organizational standards. This case study explores how this approach impacts a High School Chemistry class.

Renovation Secondary School, founded in 1932, is located in a peripheral neighborhood of Manaus and is committed to educational objective ideals. Professor Oliveira, a Chemistry teacher, finds herself immersed in this context, facing the challenge of implementing assessments designed to promote behavioral changes among students.

One Monday morning:

Prof. Oliveira: Good morning, class. Today, instead of a traditional test, we're doing a hands-on activity to explore the concepts of solutions. I want you to observe homogeneous and heterogeneous solutions and reflect on how this relates to your daily life.

Student 1 (Milena): Teacher, this is different. Why not just a multiple-choice test on the definitions?

Prof. Oliveira: I want you to experience chemistry more practically. The goal is for learning to go beyond the classroom and influence how you perceive and apply chemistry in everyday situations.

As Prof. Oliveira strives to incorporate more practical and transformative assessments, she faces unique challenges and opportunities. The push to change

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student behavior patterns demands an innovative approach to promote the practical application of the knowledge acquired.

At the heart of this study lies the teacher's dilemma: How can she adjust her teaching and assessment strategies to not only measure knowledge but also foster a transformation in how students engage with chemistry?

You are Chemistry teachers, friends of Oliveira, and you must help her propose solutions to overcome this challenge.

Source: Authors (2025).

The implementation of the strategies suggested in this case study aims at a significant transformation in student behavior and understanding of chemistry. First, by adopting practical and experimental assessments, such as the observation activity, it is expected that students will develop a deeper and more contextualized understanding of scientific concepts. This will facilitate the application of theoretical knowledge to everyday situations, thereby promoting meaningful learning that transcends memorizing definitions (Andrade; Viana, 2017).

It is anticipated that the shift to other teaching strategies, such as experimental activities, group work, seminars, and reflection on practical applications, will encourage active participation and student engagement. In this way, students will be challenged to apply theoretical concepts in practical contexts and reflect on their observations and conclusions during the formative process.

Finally, the strategy of incorporating practical and transformative assessments should promote a change in student behavior, encouraging them to see chemistry as a relevant and applicable discipline in their daily lives. It is hoped that students will show increased interest and curiosity in the subject, reflecting on a more positive and proactive attitude towards learning.

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In the long term, this behavioral transformation can contribute to the development of more autonomous and motivated students, capable of applying scientific knowledge in a critical and innovative way in various contexts. This is the vision that this case seeks to promote in future teachers.

Meeting 3 - The third case study focuses on value judgment, particularly evaluating the merit of educational objectives, encompassing the evaluation of educational programs, recognizing the role of assessment in decision-making, and diversifying assessment models (Silva; Gomes, 2018; Miguel; Justina; Ferraz, 2022).

The questions presented in this case: 1. What is the importance of feedback in assessment as judgment?; 2. How can this feedback be effective in promoting improvements?; 3. In your opinion, what criteria are most relevant when judging students' performance?; 4. Can assessment as judgment promote student responsibility for their own learning?

In this context, Case 3 presents the story of Professor Santos, who faces the dilemma of balancing academic assessment with valuing the experiences and personal development of students (Box 4).

Box 4 – Case Study 3 - Molecules of Evaluation: Narratives in the Web of Evaluative Judgment.

Molecules of Evaluation: Narratives in the Web of Evaluative Judgment.

The third generation of value judgment, predominant during the 1960s and 1970s, is characterized by an emphasis on assigning values and judgments on students' performance. This case study explores how this approach influences the teaching of Chemistry, prioritizing the understanding and appreciation of the diverse dimensions of human development and the educational process.

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The Escola Estadual Progresso, located on the outskirts of Manaus and emphasizing traditional methodologies, leaves it to the teachers to make any alterations or innovations in their didactic approaches. Professor Santos, a Chemistry teacher, adopted a more humanized approach, incorporating the principles of the third generation of value judgment, thus aiming to go beyond simple knowledge verification.

On a Thursday afternoon:

Professor Santos: Good afternoon, class. Today, instead of a test, we will have an open discussion about the last experiment. I want you to share not only the results but also how you felt during the process.

Student 1 (Beatriz): This is strange, professor. Normally, we just need to submit our results or talk about the steps of the experiment.

Professor Santos: I want to understand not only what you learned but also how the process impacted you. Let's value not only knowledge but also the experience.

Student 2 (Marcus): It's really difficult, professor. I've already written everything down in my notebook, and I even reviewed the results with Fernanda.

As Professor Santos seeks to integrate value judgment into classroom assessment, he faces challenges in balancing academic evaluation with valuing students' experiences and personal development. The humanized approach aims not only to assess knowledge but also to understand and appreciate the various dimensions of human growth.

At the core of this study is the dilemma faced by the teacher: How can he integrate value judgment in Chemistry teaching, promoting a more holistic assessment that encompasses the different dimensions of human development, while maintaining academic rigor?

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You are Chemistry teachers, friends of Santos, and you must help him discover/propose solutions to the problem he is facing.

Source: Authors (2025).

With the implementation of the strategies suggested in case study 3, a more holistic and humanized view of evaluation is expected, one that recognizes and values the diverse dimensions of students' human development. From this perspective, incorporating open and reflective discussions about the experiments conducted in the classroom aims to foster a more inclusive and collaborative learning environment.

By balancing academic evaluation with the appreciation of students' personal experiences, the goal is for students to develop a deeper and more critical understanding of chemistry concepts. This process is facilitated by the teacher's humanized approach, encouraging students to see chemistry not just as a set of facts and formulas, but as a field with real and tangible impacts on society. This recognition can promote genuine interest in science and motivate students to continue exploring and learning autonomously and curiously.

Finally, integrating value judgment into assessments should contribute to the comprehensive formation of students, preparing them for the challenges of the contemporary world. It is expected that students will show growth not only academically but also personally, thus developing essential competencies and skills.

Meeting 4 – For the 4th meeting, the concept of assessment is characterized by the analysis of the quality of the teaching and learning process, which does not occur in isolation, as it is an integral part of the educational system, being strongly linked to decisions and contextual variables involving education, society, and ethical, political, and economic aspects. Consequently, the main role of the teacher, as proposed by this approach, is to enhance the student's progress, breaking the traditional link between task completion and grade assignment, replacing it with a relationship between activity and learning, through a continuous process oriented towards development, with a process of

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negotiation between those involved in the assessment (Lima Filho; Trompieri Filho, 2013; Miguel; Justina; Ferraz, 2022).

The questions discussed before this case study: 1. How can negotiation in assessment serve as a motivational tool for students? 2. How does assessment as negotiation contribute to the continuous development of students? 3. How do you see the importance of active student participation in defining assessment criteria and goals? 4. Are there specific challenges related to diversity that need to be considered?

In this context, case 4 tells the story of Professor José, who faces a dilemma in ensuring that the negotiation approach is effectively integrated (Box 5).

Box 5 – Case Study 4 – Paths of Assessment: Beyond Tests, the Chemistry of Participation

Paths of Assessment: Beyond Tests, the Chemistry of Participation.

The fourth generation of assessment, which highlights the importance of negotiation and student participation, plays a central role in the educational process. This case study examines the implementation of this innovative approach in chemistry education, emphasizing the need to involve students in defining assessment criteria and goals.

At the State School of Continuous Progress, located in the interior of the Amazonas, Professor José, who teaches chemistry, is committed to incorporating the principles of negotiation into assessment. He believes that this approach can provide a more meaningful and fair experience for his students.

On March 2, on a Tuesday afternoon:

Prof. José: Good morning, class. Today, we will explore a different approach to assessment, which is how to improve our evaluative process in this subject. I want to hear your ideas on what is most important to assess in this subject, especially

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regarding the topic we will delve into, which will be pollution and the disposal of electronic waste.

Student 1 (Pedro): Ah, finally! I thought the tests were kind of unfair.

Student 2 (Vanessa): But how can we do this, teacher? Tests have always been like this.

Prof. José: Great observation. We can start by defining together the criteria you think are important to be assessed.

Student 1 (Pedro): This seems interesting, but how will we make sure it's fair for everyone?

Student 3 (Carla): What if we created a kind of council to review the criteria before the assessments?

Student 2 (Vanessa): In the tests and exercise lists, the questions seem disconnected from what really matters and from our reality.

Prof. José: I like the idea! Let's start from there, then. This will be an experience for all of us. Let's shape our assessment together! What else can we include?

While the teacher seeks to actively involve students in defining criteria, he faces challenges in ensuring that the negotiation approach is effectively integrated. The goal is to create an assessment that is not only a measure of performance but also a reflection of the expectations and contributions of the students themselves.

The central dilemma faced by Professor José lies in finding a balance between academic objectivity and the active participation of students in defining assessment criteria. How can he ensure a fair and transparent assessment while valuing students' perspectives and involvement?

You are chemistry teachers who came to an event at José's school and will need to help him discover/propose solutions for the problem he is facing.

Source: Authors (2024).

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The expected outcomes with the implementation of the strategies suggested in Case Study 4 aim to promote a more participatory and meaningful assessment, reflecting both the teacher's expectations and the contributions of the students.

The intention is that, by actively involving students in defining assessment criteria and goals, a greater sense of responsibility and commitment to their own learning process will be developed. The creation of a student council to review and adjust assessment criteria promotes a more democratic and collaborative environment where students feel heard and valued, resulting in increased motivation and engagement in school activities.

Regarding the replacement of the traditional link between task completion and grade assignment with a relationship between activity and continuous learning, the negotiation approach can provide a fairer and more equitable educational experience. It is expected that students, as well as graduates, will perceive assessment as a dynamic and development-oriented process, rather than a final judgment of their abilities.

Therefore, the implementation of participatory assessment should contribute to the development of students' critical and reflective skills by involving them in defining the assessment criteria. In this line of action, students develop self-assessment and metacognition skills, becoming more aware of their strengths and areas for improvement. By ensuring that the assessment is fair and transparent, Professor José can ensure that the results truly reflect the students' learning and development, thereby promoting a more inclusive and effective education and implementing a new perspective on assessment in education

Meeting 5 – For the fifth meeting, the concept of learning assessment is associated with the fifth generation, which aims for a strategic, political, social, and participatory process – defined as an assessment resulting from social construction. In this context, there is a notable commitment to social and political aspects based on collaboration and solidarity, thus overcoming individualistic approaches. This new generation represents a long-term project, in which academic progress is inextricably linked to social issues (Miguel; Justina; Ferraz, 2022).

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Before the case, however, it is interesting to discuss the following questions: What are the practical challenges teachers face when trying to incorporate contextual elements into assessments? How can we involve the school community (parents, students, teachers) in building more effective assessment practices?

To that end, Case 5 presents the story of Professor Mirla, who faces a dilemma in ensuring that assessment methods recognize and value the cultural diversity present in her classroom (Box 6).

Box 6: Case Study 5 – Cultural Harmony in Assessment: Unveiling the Mosaic of Diversity in Chemistry

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Cultural Harmony in Assessment: Unveiling the Mosaic of Diversity in Chemistry

The fifth generation of assessment, focused on assessment as social construction, emphasizes the importance of recognizing the socially and culturally constructed nature of this process. This case study explores how this approach is implemented in chemistry teaching, valuing the context, social relationships, and cultural influences in the assessment practice.

At the State School Recanto do Aprender, located in downtown Manaus, Professor Mirla, a chemistry teacher, leads the initiative to incorporate the principles of the fifth generation of assessment. The Curriculum Pedagogical Proposal (PPC) states that school actions embrace the cultural diversity present among students, recognizing it as an asset for learning, but the reality is different.

On Wednesday morning:

Professor Mirla: Good morning, everyone! Today, instead of a traditional assessment, we will carry out an activity that reflects the cultural diversity in our classroom.

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Student 1 (Daniel): This is new, teacher. How will we be assessed?

Professor Mirla: Great question! We will create criteria together that consider not only the content but also the way each of you approaches the activity, taking your cultural experiences into account.

In seeking to incorporate assessment as social construction, Professor Mirla faces challenges in ensuring that the assessment methods recognize and value the cultural diversity present in the classroom. The approach aims to go beyond standardized assessment, promoting a deeper understanding of students in their social and cultural context.

The central dilemma faced by Professor Mirla lies in how to effectively integrate social and cultural elements into the assessment practice, ensuring a fair and contextualized evaluation for all students. How can she balance cultural individuality with academic goals?

You are chemistry teachers and friends of Mirla, and you will need to help her discover/propose solutions for the problem she is facing.

Source: Authors (2025).

The expected outcomes with the implementation of the strategies suggested in Case Study 5 aim to promote an inclusive and contextualized assessment that values the cultural diversity of the students. Therefore, by involving the students in the creation of assessment criteria that take their cultural experiences into account, the intention is for them to develop a greater sense of belonging and recognition within the school environment, consequently making them more harmonious and respectful in a space where diversity is seen as a valuable asset.

By incorporating assessment practices that reflect the social and cultural context, and understanding the reality of the students, cultural elements are integrated into the assessment activities, making it possible to help them build connections between academic

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content and their everyday lives, thus making learning more relevant and applicable. This approach can also encourage students to develop critical and reflective thinking skills as they explore and share different cultural perspectives on the topics being studied.

Finally, promoting assessment as social construction should contribute to the development of intercultural competencies in students, focusing not only on the classroom but also beyond the school walls, fostering more empathy, tolerance, teamwork, and societal engagement.

Furthermore, the participatory and contextualized approach can help reduce educational inequalities, as it ensures that all students have opportunities to demonstrate their learning in a fair way. By balancing cultural individuality with academic goals, the teacher, in their practice, enables an inclusive and enriching learning environment.

Meeting 6 – The last case is focused on the 6th Generation of Assessment, which emphasizes socioemotional aspects, largely due to the COVID-19 pandemic and the post-pandemic period, which highlight discussions around mental and social care. Therefore, the assessment is centered on addressing demands related to social policies and socioemotional education, seeking to bring values such as solidarity, responsibility, collaboration, and empathy. It distinguishes itself from previous generations due to contemporary social changes (Miguel; Justina; Ferraz, 2022).

Before the case, the following questions are presented: What strategies can be used to effectively and ethically assess the socioemotional development of students? How can teachers balance the assessment of academic knowledge with the assessment of socioemotional aspects?

Case 6 presents the story of Professor Kaio, who faces the dilemma of how to effectively integrate socioemotional elements into the assessment (Box 7).

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Box 7 – Case Study 6 – Molecular Symphony: Harmonizing Emotions in the Chemical Evaluation of Life

Molecular Symphony: Harmonizing Emotions in the Chemical Evaluation of Life

The sixth generation of assessment, emerging in the context of the COVID-19 pandemic, stands out for its focus on socioemotional aspects, considering social, emotional, formative, political, and ethical elements. This approach seeks to promote a more emancipatory and dialogue of self-assessment and an emphasis on socioemotional education. This case study explores how these principles are applied in chemistry teaching.

At the Escola Estadual Esperança Renovada, located on the outskirts of Manaus, Professor Kaio, a chemistry teacher, leads the implementation of the sixth generation of assessment in his professional environment. The school faces challenges post-pandemic, seeking to strengthen the socioemotional aspects of the students.

One Monday morning:

Professor Kaio: Good morning, everyone. We know it's been a difficult time. How are you feeling about the classes? And about my chemistry classes?

Student 1 (Renata): Sometimes, it’s hard to concentrate, professor. So many worries.

Professor Kaio: I understand. Let’s do something different today. I want you to share how you're feeling and how chemistry can be a tool to deal with these emotions.

By implementing socioemotional assessment, Professor Kaio seeks to go beyond grades and create an environment that values students' well-being amidst

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contemporary challenges. The approach emphasizes the importance of resilience, self-assessment, and dialogue for the holistic development of students.

The central dilemma faced by Professor Kaio is how to effectively integrate socioemotional elements into the assessment, considering the impacts of the pandemic and the emotional issues widely discussed in society, which reflect on students' learning and well-being. How can an evaluative environment be created that promotes resilience and socioemotional development in challenging times?

You are chemistry teachers, friends of Kaio, and you must help him discover/propose solutions to the problem he is facing.

Source: Authors (2025).

The expected outcomes of implementing the strategies suggested in Case Study 6 aim to promote an assessment that effectively integrates socio-emotional aspects into the teaching and learning process, especially in response to the challenges of the post-pandemic period. First, by introducing practices that encourage students to express their feelings and concerns, the goal is for students to develop emotional awareness and self-reflection skills through activities such as group discussions or self-assessment exercises, where students reflect on their emotional state and its impact on learning, thereby strengthening resilience and fostering a supportive environment.

Secondly, it is expected that the integration of socio-emotional elements into the assessment will help cultivate essential competencies in students, such as empathy, responsibility, and collaboration, through activities that encourage teamwork and peer support, like collaborative chemistry projects where students solve problems together. Additionally, strategies such as mock trials or role-playing in addressing various issues will allow for the creation of a more supportive and inclusive learning community, where everyone feels valued and supported.

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Therefore, the promotion of an assessment centered on socio-emotional aspects should contribute to the holistic development of students, better preparing them to face the challenges of reality, demonstrating improved abilities to manage stress and anxiety – critical skills in a post-pandemic world.

3 Final Considerations

This paper proposed a training workshop based on reflection and the evolution of generations of educational assessment through six case studies in chemistry teaching, highlighting the challenges and innovations of each assessment generation approach. In summary, the evolution of assessment practices reveals a growing understanding of the complexity of the educational process and the need for more inclusive and equitable approaches, incorporating formative, cultural, and socio-emotional elements, rather than relying on tests and exams.

The experiences of teachers Silvia, Oliveira, Santos, José, Mirla, and Kaio serve as a valuable guide for the formative process of future teachers who seek to reflect, innovate, and improve their assessment practices, thus promoting a fairer and more meaningful education, capable of including everyone.

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