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## Evaluation processes in the school context: Production of collective knowledge

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**Abstract.** School evaluative processes are motivators for several discussions in pedagogical environments, so that, if evaluations are poorly constructed and decontextualized, they imply learning processes and school permanence. In this sense, the present study aims to relate the performance obtained by high school students, during the four academic terms of the year 2014, with the contents taught during each of these two months, in order to promote useful discussions to the pedagogical environment. We present a reflection on the structural mechanisms of exclusion and dropout, and also on the evaluation processes in the discipline of chemistry, in high school classes. We emphasize that it is necessary to employ pedagogical practices aimed at the plurality and democratization of knowledge, with classes that include qualitative methods of assessment, and linked to the context of students, based on training for the promotion of autonomy.

**Keywords:** Evaluation, Construction of knowledge, Qualitative evaluation.

### Introduction

Educational processes require constant updating and diagnosis of their performance. Assessment in the age of digital communication is not limited to one technique but is considered a “transdisciplinary”, as it applies to a single field that offers reflection tools in all areas of knowledge involved in the learning processes. The constant practice of evaluations is introduced in various spaces, so that they are elaborated, both externally for interventions and discussions, and internally, integrating part of the planning and management of educational institutions (SCRIVEN, 2005).

According to Minayo (2011), there were several changes in the paradigm of social relations and production, after intense industrial revolutions, which modified the flow and distribution of information and actions. According to the author, changes in the orientation of evaluations are recent, since there is an authoritarian and clientelistic culture, which still manifests itself in pedagogical training. There are examples of funding agencies, such as CAPES, that show the strengths and weaknesses of science and technology projects, through structured and constant evaluations. Such practice can add to the practices of teachers in the country, regardless of the level of education.

It is essential to question whether students have learned or not if there were difficulties, which were, and for what reasons so that learning is constructed in a more appropriate and meaningful way. These results become a subsidy to outline new activities in the educational process.

Certain school content requires more preparation and study, both for students and teachers. In this movement, the guiding question of this article is: How is student performance influenced by specific contents of the chemistry discipline? The objective of this study is to relate the performance obtained by high school students, during the four academic terms of the year 2014, with the contents taught during each of these two periods, to promote useful discussions. Below, we specify the Methodology and resources used to prepare the study.

### Methods

#### *Data collection and discussion*

The research was developed in a bibliographic (through articles, dissertations, books, and digital media) and quantitative, combining theory with data obtained from the average grades obtained in the months of 2014 in the discipline of Chemistry, from the 1st year of high school in the morning and

afternoon periods, at a public school in the municipality of Tangará da Serra-MT. The contents taught every two months were also presented to reconcile students' performance with the topics covered in the discipline.

#### *Processing of quantitative data*

The average grades obtained by students in the 1st year of high school, during the months of the Chemistry discipline, were plotted in the form of graphs using Microsoft Excel 365® software. In addition to the average grades for every two months, the average dropout rate for students in the Chemistry discipline during the entire academic year was also calculated. The data were organized according to the periods: morning (classes from "A" to "G") and evening (classes from "H" to "P").

#### **Results and discussion**

According to Minayo (2011), there are two types of actions in the evaluation that are complementary: monitoring and evaluation in itself. In the evaluation, activities that measure efficiency, effectiveness, and effectiveness of the learning processes are put into practice. Monitoring is understood through observations and records of activities carried out by students within a project, or over a specific period of basic education. Both monitoring and evaluation are in processes of interdependence.

Teaching and learning conditions also influence performance and, consequently, the evaluation of regular students. Paulo Freire (1987), in his assumptions, defends the school as a space for the democratization of knowledge and the promotion of autonomy. In this movement, the next subsections deal with the teaching landscape and its implications. Next, in the subsection entitled "Panorama of inequalities in education", we will analyze the effectiveness of educational processes, concerning frequency and opportunities for access to education.

#### *Panorama of inequalities in education*

According to Minayo (2011), a good assessment serves to reduce uncertainties and improve actions that provide relevant decision-making in educational processes. The assessment allows us to identify weaknesses, strengths, and all elements that directly affect performance. The evaluations objectively serve as a subsidy for verification in institutions, government, and society, in general. They also serve to guide funding agencies on the best use of resources and projects, aiming at collective and institutional development. Finally, the evaluations serve to improve and adapt them to school practices. The following illustrates, in Figure 1, the elements that make up the effectiveness of the evaluation processes:



**Figure 1:** Evaluation effectiveness. Adapted from Minayo (2011).

It should be noted that these elements presented in Figure 1, work interconnected in the educational process. We realized that not all assessments applied in the school environment are productive and inclusive. Assessments, if poorly designed, can level off meaningless responses. Assessments, if poorly based, can be biased and superficial, measuring knowledge in a purely quantitative way. Even so, even if the evaluation is well elaborated and reflected, it is not the solution to structural problems in teaching, and the constant learning processes are fundamental to the construction of a structured cycle in the evaluations. What are the current reflexes of the results of evaluations in the school context? Do the results in evaluations influence school dropout? There are many justifications for the disparity in access to public education.

According to Arroyo (1992), several factors lead to dropping out of school, and the school system has produced and reproduces fixed subjects, with limitations of passing or failing based on criteria that come from a moment that no longer fits the evaluative needs of contemporary times.

There are two groups of exclusion factors, those that come from the school institutions themselves, such as poorly constructed evaluation aspects and bureaucracy in the school spaces, and also the extra-school factors that are socioeconomic and people, in interdependence. We present, below, Figure 2, with a graph that measures the dropout of students of the first year of high school in the discipline of chemistry, in the morning and afternoon shifts:



**Figure 2:** Withdrawal in the discipline of chemistry. Source: authors (2020).

The results in Figure 2 showed that the dropout percentage reached over 20% of students in the morning shift, and in the afternoon shift it reached close to 50% of students, which represents half of the first-year class of the high school. The dropout rates were high, so they were even more worrying in the afternoon shift.

Such dropout levels highlight the need to revisit school practices, which have become exclusive, contrary to the principles of quality public education.

Several factors cause school dropout in the chemistry subject, and the contextualization of the contents covered in high school is a determining factor for the continuous motivation for studies.

According to Faria and Moura (2015), the educational system is exclusive in its conception, especially concerning the popular working classes. The cultural goods and scientific knowledge produced are not democratically directed at everyone. Preventing access to school causes loss of fundamental rights, such as social reflection and insertion in other spaces, such as the job market, which guarantees sustenance and quality of life. Many students still resist the processes of exclusion and continue in their studies, and understanding the intrinsic motivations that lead to permanence is a way to promote the democratization of access to education, in this case, the teaching of chemistry. According to Riguetto et al. (2016):

To contribute effectively to this construction process, it is necessary to provide interactive and practical situations, favoring the understanding of the concepts covered, especially in the teaching of chemistry. Approaching theoretical knowledge without experimental practice is the same as discussing the causes without having direct contact with empirical phenomena, which means ignoring the particular and running the risk of formulating mistaken explanations and understandings (RIGUETO et al., 2016, p. 16).

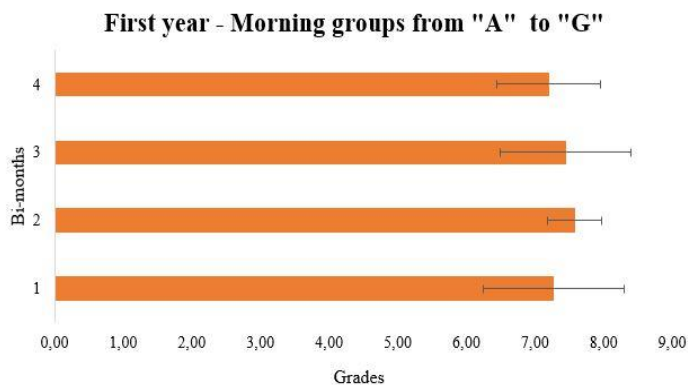
The inclusion of historically excluded subjects occurs from the recognition of social weaknesses and inequalities in educational institutions. According to Freire (1987), the subject can recognize its importance and significance in the world when it recognizes its intangible reality and aims to change. From the awareness of the processes of exclusion, students can take active attitudes in the challenge of social transformation and the transposition of barriers in educational institutions.

Contextualized education promotes the presentation of real problems and the constant search for knowledge for the reflection and solution of these problems. It is necessary to promote contextualized school practices, with the relationship between the contents of chemistry from the first year of high school to the students' daily lives, promoting interculturality. In meaningful learning processes, context and meaning are fundamental for effective training in the discipline of chemistry (PARÂMETROS CURRICULARES NACIONAIS, 1998).

According to De Almeida et al. (2008), students are more motivated to understand the contents of chemistry with practical and dynamic classes, which enable interaction between all in contextualized practices. It is necessary to cover a previous diagnosis and also qualitative assessments, to promote equity in chemistry classes.

*Chemistry content and challenges*

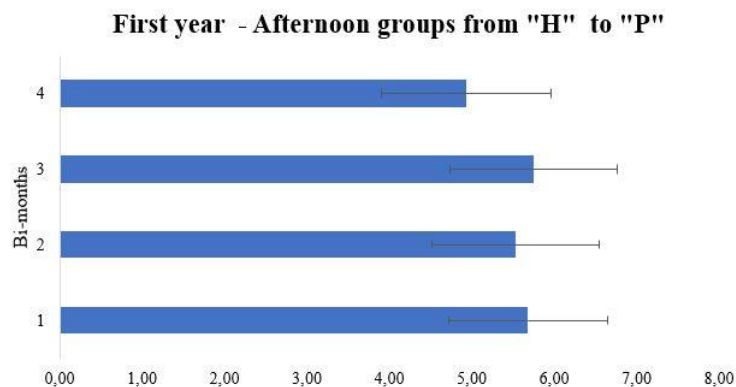
Next, in Figure 3, we present the evaluative results obtained in the first-year classes of high school in a public school. We can observe a graph with the representation of the notes of chemistry, of students of the first year of high school, in a public school of the municipality of Tangará da Serra / MT, divided by four months:



**Figure 3:** Evaluative results in the chemistry / morning discipline. Source: authors (2020).

Figure 3 illustrates in a graph the average number of students from the first high school in the discipline of chemistry, in the morning shift. The results show good averages, and the average of the lowest grades was noticed in the last two months of the subject in question. We recognize that grades below 7.0 demonstrate poor performance in the evaluations, and, in the morning shift, there were few occurrences of grades below average.

On the other hand, high marks and close to the maximum limit also show few occurrences, which may show some flaw in the evaluative processes of the school in question, whether from the teaching staff, composed of teachers and other professionals, as well as the student staff, composed of the students' high school. Then, in Figure 4, we illustrate the averages obtained in first-year classes of high school, this time, in the afternoon shift:



**Figure 4:** Evaluative results in the discipline of chemistry / afternoon. Source: authors (2020).

Figure 4 shows, in graphic format, a bi-monthly average obtained by high school students, in the chemistry discipline, in the afternoon shift. The results were responsible for the finding that the averages of the two-month periods remained low, with emphasis on the fourth semester, which was presented with the lowest grades of the academic year. Few students exceeded the average of 7.0 points, which represents negative results obtained by students of the afternoon shift, in the discipline of chemistry. We show, in this figure, the expressiveness of negative results, which give us clues of flaws in the teaching processes. The constant process of improving the evaluation criteria is a point defended by Minayo (2011), who highlights

The analytical and systematic path, therefore, has the sense of making possible the objectification of a type of knowledge that has as raw material opinions, beliefs, values, representations, relationships, and human and social actions from the perspective of the actors in intersubjectivity. In this way, the qualitative analysis of an object of investigation realizes the possibility of building knowledge and has all the requirements and instruments to be considered and valued as a scientific construct (MINAYO, 2012, p. 626).

Still, in Figure 3, which illustrates a graph of the average number of students from the first high

school in the discipline of chemistry, in the morning shift, we recognize that the results show good doctors, with the average of the lowest grades being perceived in the last two months of the subject in question. We recognize that grades below 7.0 demonstrate poor performance in the evaluations, and, in the morning shift, there were few occurrences of grades below average. On the other hand, high marks and close to the maximum limit also show few occurrences, which may show some flaw in the evaluative processes of the school in question, whether from the teaching staff, composed of teachers and other professionals, as well as the student staff, composed of the student's high school.

According to Minayo (2011), success in evaluation needs to follow four parameters. The parameter of the usefulness of learning, of viability, which takes into account the cost-benefit of certain evaluation methods, the ethical dimension, related to respect and values in the evaluation criteria, and, finally, the technical dimension, which is decisive scientific parameters for the elaboration of evaluation processes. In this perspective, we present, below, Figure 5, which explains the contents taught in the discipline of chemistry in a school in Tangará da Serra / MT, according to the bi-month terms:

CONTENTS	BI-MONTH
Introduction to the study of Chemistry	
Substances, Mixtures and Mixture Separation Processes	1
Chemical reactions	
Atomic models and structure of the atom	2
Periodic Table: History and properties	
Chemical bonds	3
Inorganic functions	4

**Figure 5:** Content covered in the chemistry discipline. Source: authors (2020).

In Figure 5, we structure a figure with the disposition of the main contents of the chemistry discipline of the first year of high school, distributed by academic semesters. We seek to relate the data obtained in the evaluative results of the graphs, with the contents covered in the two-month terms. In this sense, the relationship established showed that some of the contents covered resulted in low student averages and little use in the discipline.

We highlight the fourth quarter, which in both shifts, especially in the afternoon shift, was marked by low evaluation averages in the content of "Inorganic functions". We asked ourselves about the reasons for low grades, and about the effectiveness of the teaching practices taught: Is it possible to measure student performance with a quantitative approach? What are the assumptions that guide you to practice in the elaboration of assessments that build significant knowledge?

We realized, with the theoretical contribution, that the motivations for learning and assessments need to be linked to the dynamic practices of interaction between teachers and students.

The evaluation based on other approaches, which are not only quantitative, favors the expansion of possibilities for evaluative constructions (DE ALMEIDA, 2008).

According to Assis and Borges (2001), the chemistry content needs to be problematized by teachers and students, to select good sources and criteria for selecting the content that will be the basis for the evaluation processes. In line with Milare and Pinho-Alves (2010), the contemporary educational scenario requires the pedagogical redo of educational praxis in the training of chemistry and science teachers. School science programs need to be revised, as they are marked by traditional content, and lack of contemporary topics. This curricular revisiting needs to be done by professionals committed to viable content and allied to the Brazilian document called Base Nacional Comum Curricular (2015).

According with Assis and Borges (2001), the teaching of significant chemistry is oriented towards the chemical transformations that take place in

different contexts. Much of the knowledge in the chemistry discipline requires students to have mathematical knowledge that students have not yet built, and which cannot be satisfactorily trained in chemistry classes. Still, according to the authors, many concepts are worked very superficially, becoming, later on, barriers to the understanding of chemistry contents in high school.

The education of citizens needs to understand the discipline of chemistry, and its respective problems, which require informed decision-making. The knowledge of chemistry should be inserted in teaching as tools for understanding themes, also tools for solving social issues (SANTOS; SCHNETZLER, 2003).

It is necessary to discuss the contents and approaches in the school syllabus. Decontextualization, poorly planned assessment, and content approach without mechanical application had consequences for students' bimonthly averages. The contents covered need to be related to daily life and value the construction of autonomy.

### Final considerations

It is concluded that the objective proposed in this study to relate the performance obtained by high school students, during the four academic terms of the year 2014, with the contents taught during each of these two periods was achieved since we reflect and promote useful discussions, based on the theoretical assumptions presented in the article.

The analysis of the quantitative data corroborated the qualitative assumptions of the research, considering that the challenges of teaching chemistry in high school are diverse. The results were analyzed reflexively through the verification of panoramas of social inequalities in the Brazilian reality, linked to content considered more laborious and too exclusionary and outdated evaluation processes.

The contemporary reality in teaching is still marked by excluding processes and education is also impacted by inequality in teaching. It is necessary to employ pedagogical practices aimed at the plurality and democratization of knowledge. Classes need to



cover qualitative assessment processes and need to be linked to the context of students so that institutional practices are guided by the training of trained and autonomous professionals.

Finally, as a perspective for future work, we stress that other researchers present studies about the evaluation processes and possible reflections on inequality and dropout in education. We also look forward to teaching proposals aimed at democratization and permanence in teaching.

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