

# Formative Assessment and *Feedback*: Report of Mathematics Teacher's Professional Formation Project

Carlos Augusto Aguilar Júnior<sup>1</sup>, Amanda Azevedo Abou Mourad<sup>2</sup>,  
Rafael Guimarães de Assis Motta<sup>2</sup>

<sup>1</sup>University College Geraldo Reis, Federal Fluminense University, Niterói, Brazil

<sup>2</sup>Federal Fluminense University, Niterói, Brazil

Email: carlosaugustobolivar@hotmail.com, amandamourad@id.uff.br, rafael.profissional.2000@gmail.com

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## Abstract

In the present study, we report the experience with formative assessment and the use of (formative) *feedback* during the Remote Education process in the pandemic academic year 2020. Using a qualitative methodological approach, we collected the answers given by students in interdisciplinary activities in a remote online learning platform and, based on it, we developed individualized training *feedback* for students from a federal elementary school of UFF (COLUNI-UFF) at Federal Fluminense University (UFF), located in the city of Niterói (RJ), in Brazil. To perform this *feedback*, a database was created with the students' responses to the proposed interdisciplinary activities. With this exercise, there was a significant improvement in the performance of the students, so that the error was seen as a learning possibility. This process was important for the project fellows, graduating in Mathematics, who realized the importance of formative assessment and the use of formative *feedback* aimed at the effective learning of students.

## Keywords

*Feedback*, Formative Assessment, Mathematics Education, COVID-19 Pandemic, E-Learning

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## 1. Introduction

The discussion about evaluation processes has gained relevance in the field of Education. With the advent of large-scale evaluation systems in several countries, with emphasis on the International Student Evaluation Program (PISA), concern about the teaching and learning processes of students has been recur-

rent among educational managers and educators. During the pandemic year 2020 (COVID-19 pandemic), the school institution had to operate in a non-face-to-face, remote, online, and distance manner. Given this scenario, the need to think about teaching methods emerged, especially in relation to evaluative processes. Since the school was functioning in a non-face-to-face manner, without closer contact between the students and the teacher, it is important performing an evaluation with a more formative nature, especially based on the use of *feedback*.

In this paper, we report the pedagogic approach accomplished during COVID-19 pandemic at University School Geraldo Reis (Coluni UFF), located at Niterói, Rio de Janeiro, Brazil, in 2020. Looking at the adaptation of the pedagogic processes for the online format, the present study is the result of a project that has been subjected to the Federal Fluminense University Degrees Program for the awards of scholarships for undergraduate students. This program aims at contributing the teacher training of Basic Education, fostering the teaching initiation of the scholarship holder. Specifically, in the context of the remote and on-line pedagogic work at Coluni-UFF. The developed project consisted in the elaboration of formative *feedback*. Those *feedback* were projected for the answers that the students showed on the activities on the process of collaboration and integration between Mathematics', Sciences', Chemistry' and Physics' teachers.

At the present moment, in which we are facing COVID-19 pandemic, the world population is affected in many areas of life, including Education. The [World Health Organization \(WHO, 2020\)](#) declared, in March, 11 2020, the pandemic of the new Coronavirus (SARS-CoV-2) and warned about this virus transmission. Since then, many studies and recommendations made by infectologists and other health specialists indicate the importance of frequent hand sanitizing, mask use, the pivotal social distancing and the quarantine for the ones who may be infected.

In Brazil, social inequality worsened, and the access to technology caused a huge difference in the education among students who are able to keep going and those who don't have the same condition. A recent study made by FGV Social ([Neri & Osório, 2020](#)) shows that the Brazilian public school students dedicated 2.37 daily hours for remote learning, in average, for the age range of 6 to 15 years old. Moreover, according to the authors, the social-economic cut points that the poorer students represent "633% of the most affected by the lack of school activities offered, than the richer students. Consequently, it is concluded that, the inequality of opportunities and the educational results, will increase during the pandemic, breaking the historic tendency" ([Neri & Osório, 2020: p. 3](#)).

By this way, schools got nearly a year with their doors closed and the educational processes happened in alternative ways, such as remote and online. Amidst imposed restrictions by the pandemic, teachers had to reinvent quickly, in order to handle the didactic-pedagogical activities. These activities were performed without losing sight of the commitment to a high-quality education and

motivation for the students. Thus, they joined distance education and remote learning, using several virtual platforms. In this context, it is essential to master the tools that Information and Communication Technologies (ICTs) offer us. These may be explored as educational instruments that allow us to keep track nearer of the students' pedagogic development and the learnings. Indeed, it has been asked the best ways to evaluate the students of Basic School, considering: what we've been through, the students that need to work and study, the social context and the difficulty of following the e-learning classes. Thus, we decided to work with *feedback* production and formative evaluation.

Bearing those perspectives in mind, Coluni-UFF teaching staff built a virtual education environment, a website called Quarentuni<sup>1</sup>, as a way to give continuity to the 2020 school year. Furthermore, for the students who don't have access to the platform, they were offered printed materials, taken off from the school collection with all the safety measures complied. Through the platform, there were various interdisciplinary activities, so the students could think and answer the questions proposed. All of them making dialog with actuality and the applicability in daily life.

Therefore, teacher groups were formed, divided by knowledge areas: Portuguese Language and Literature, Nature Sciences and Mathematics, Arts, Body and Culture, Foreign Languages and Humanities. During this Project, scholarship holders' main activity was developing formative *feedback* for each student. This was done through individualized evaluations of the elementary school final years and high school students using the Quarentuni platform. Those *feedback* not only allow students to follow their own progress on the understanding of the concepts, instruments and math techniques explored, but also help us to have an individualized view of each student. Moreover, it also brings benefits for the teachers, such as: the *feedback* shows evidence of the students' learning, allowing them to identify a substance that wasn't clear and change the learning strategies. We were inspired by the reading of Fernandes (2006, 2008), Lagarto (2009), Rosado and Silva (2014), Hoffmann (2001), Hattie and Timperley (2007), Black and William (1998a, 1998b), Luckesi (2002) and Perrenoud (1993).

In this paper, we use the exploratory research, of qualitative intent, as the methodology. Our intention was to work, on the one hand, the initial formation of the mathematics teacher, discussing assessment of learning and for learning, and on the other hand, the learning, through the *feedback* of the students that answered the given activities through Quarentuni platform.

## 2. Theoretical-Methodological Framework

First, we need to define the evaluation. Perrenoud (1993: p. 173) defines it as the process that "helps the student to learn and the teacher to teach". In this sense, according to Luckesi (2002), the evaluation provides an understanding of the

<sup>1</sup>Quarentuni is a virtual education environment that was created by Coluni UFF teachers with the aim of maintaining the bond with students and promoting cognitive mobilization and building knowledge. The Quarentuni website is available at: <https://quarentuniuff.wixsite.com/coluniuff>.

learning phase in which the student is, so that the teacher can make “sufficient and satisfactory decisions so that (the student) can advance in the learning process”. The learning process on the part of students is an individual and private experience. With the exception of teaching processes that are structured in a more general learning perspective, from the set of students in a given class, the experience and assimilation of the contents taught occurs individually. In this sense, according to Perrenoud (1993: p. 173), learning is not characterized by a straight, single and ready line, but that “proceeds by trial and error, hypotheses, setbacks and advances” in these teaching and learning processes.

According to Fernandes (2010: p. 15), the evaluation, as a social and school practice, consists of understanding and characterizing problems. And from this understanding and characterization the pedagogical action will be directed in the sense of overcoming/solving the problem encountered. Let us recognize the role and importance of evaluating. Evaluation of the educational process allows verifying how students’ learning develops, enabling the detection of difficulties and leading the teacher to rethink his pedagogical action with a view to the learning of his students. From this perspective, the discussion brought by Fernandes (2006, 2008, 2010) helps us to think about the role of evaluation in the educational process. In the literature that we select to reflect the role of evaluation in the learning process of students, we see that Fernandes claims to think of evaluation as a science, equipped with its theory, with concepts and definitions intrinsic to this theoretical body, and the research in this field, very marked by practice, should be covered with the necessary scientific rigor. Fernandes (2010) points out that an evaluation theory should take into account some elements that were evidenced by several studies that built the field of research in evaluation as a theoretical field. The elements that the author points out are: 1) the main purposes of the evaluation; 2) the methodological perspective adopted; 3) the role of the evaluator; 4) the role and degree of participation of stakeholders, who are all agents interested in the evaluation process—teachers, students, guardians, among others; 5) setting priorities of the evaluation process; 6) nature and dissemination of the evaluation report. Considering that these elements are present in a diversity of theoretical approaches present in the literature, as Fernandes (2010) warns, it is important to have what the author calls pragmatic discernment, so that one can “distinguish, separate different evaluative approaches (...) to be able to use them properly” (p. 18), when one is in the context of evaluative practice.

The evaluation in e-learning (use of technologies to expand the possibilities of the student to build knowledge), according to Lagarto (2009), can be analyzed from two different points of view: the systemic and what has direct effects on learning. The first allows mainly analyzing the critical points of the evaluation model, in addition to the reasons for the success or not of training initiatives in e-learning. The second point of view is related to the verification and control of learning, which we cover in this research. In the field of evaluation, there are two basic currents about their meanings and objectives: summative evaluation and

formative evaluation. Essentially, the summative evaluation refers to the need to present a result of the learning process, characterizing, as [Fernandes \(2006\)](#) points out, “for emphasizing the classification, selection and certification processes, the results obtained by the students, the summative use of test results or the accountability” (p. 25). Thus, large-scale exams have played in different educational systems around the world, serving to select and certify students, as is the case in Portugal ([Fernandes, 2007](#)) and Mexico ([Barriga, 2014](#)), for example, and to intend to have policies of teacher responsibility, as shown in [Bonamino and Zakkia \(2012\)](#). According to [Hoffmann \(1991\)](#), it is verified that the summative evaluation “reduces the evaluation to the control and judgment of the final results”.

In line with what [Fernandes \(2008\)](#) brings us, we understand that the summative evaluation, or evaluation of learning, was constituted as an evaluative process always carried out after the development of a block or module of curricular contents, thus allowing the constitution of a diagnosis of the student about what he knows until a given moment, used to classify and select students, in most cases, and report on the learning that has occurred. On the other hand, the formative evaluation, or the evaluation for learning, concerns the evaluative practice focused on the learning process, not only as a certificatory of learning, but as a pedagogical activity that values the pedagogical contexts that focus on the teaching and learning process. About the formative evaluation, [Fernandes \(2008\)](#) presents us with the main discussions of the two most frequent and referenced traditions—French and English. Generally speaking, the French tradition, greatly influenced by Perrenoud’s studies apud ([Fernandes, 2008: p. 352](#)), will characterize that formative evaluation is concerned with studying and knowing how students learn, stimulating in these the emergence of self-regulation processes that guide their learning. In this perspective, the teacher loses the centrality in the teaching and learning process, because the pedagogical action that fosters and develops the autonomy of the student and his/her ability to understand their own processes of knowledge construction is valued. *Feedback* is considered in the process of evaluations for learning, but it is not so valued, considering that in this perspective the development of autonomy and self-regulation of students is the central point of French theorization for formative evaluation. The French school will view formative evaluation as a pedagogical process in which the teacher gains prominence in his role as facilitator of students’ learning. In this context, the evaluation processes have the function of important *feedback* for the *feedback* of the teaching and learning process, and the teacher’s self-regulation is directed towards a constant rethinking of their practice and control of curriculum development, since the evaluation certifies and credits, in the thesis, the learning of curriculum contents. Thus, the curriculum is central to the pedagogical process, in which evaluation is seen as an action through which learning is verified. In summary, it is observed that both traditions point us to important paths that lead us to reflect on the role of evaluation in the pedagogical-school process. We believe that it is an important role of evaluation to bring us a more

accurate and reliable diagnosis possible about the learning achieved and consolidated and on the difficulties of students. We also understand that the formative evaluation process needs to take place in an interactive environment, marked by the continuous evaluation of the teaching and learning process and in which students are more protagonists of their learning through the processes of self-regulation and self-assessment.

However, the formative evaluation is about the continuity of the evaluation during learning, without the need for a concept or final grade, as shown by [Lagarto \(2009\)](#), “continuous monitoring of the understanding of the new concepts and the information worked”. In addition, according to the National Council of Mathematics Teachers (NCTM), “Formative assessment is any assessment task designed to promote student learning”. As in [Rosado & Silva \(2014\)](#), we are interested in the evaluation of learning, processes and products, methods, means and materials used and in the results obtained by students. In the context of learning assessment “it is necessary to evaluate cognitive, social and motor skills, these skills corresponding to the essential domain of evaluation” ([Rosado & Silva, 2014](#)). And for that, we use formative *feedback*. As stated above, we chose to work with formative evaluation, giving *feedback* to students, because, like [Hoffmann \(2001\)](#), with formative evaluation, we aim at the evolution of students’ learning. For NCTM and the Association of Teachers Educators of Mathematics (AMTE), *feedback* is one of the strategies that supports the use of formative assessment. According to them, effective *feedback* strategies should be focused on getting students to take action and can help them reflect and rethink their math while doing an activity, task, or discussion in the classroom. In addition, the quality of feedback provided is also important, since it is “a fundamental feature in any formative evaluation procedure” ([Black & William, 1998a](#)). For [Hattie and Timperley \(2007\)](#) “feedback is conceptualized as information provided by an agent (e.g., teacher, colleague, book, etc.) about aspects of their performance or understanding”. According to the study, the goal of *feedback* is to help students get where they are where they need to be. And to achieve this goal, they developed a model, similar to the model created by [Black and William \(1998b\)](#), where they propose three questions for students and teachers to consider: 1) Where does the student go? (goals); 2) Where is the student now? (progress); and how does the student get there? (actions needed to improve). Both studies consider that *feedback* is effective when these three questions are answered. There are many ways to give *feedback* (e.g., for punishment, praise, scheduled instruction, etc.), but since “the most effective forms of *feedback* provide clues or reinforcement to students” ([Hattie & Timperley, 2007](#)), we decided to adopt this method to promote *feedback* that moves the student forward.

### 3. Quarentuni Platform and the Teaching and Learning Processes

As mentioned in the introduction, thanks to the COVID-19 pandemic, we had to adapt our project to a challenging reality from the didactic-pedagogic point of

view, using e-learning. We chose for an evaluation on the learning, i.e., formative evaluation. To do that, we used the virtual interactive environment of education Quarentuni, created by Coluni teachers.

This platform, of pedagogic character, affective, ludic and interdisciplinary, is daily fed by posts—such as videos, documentaries, musical clips, information, texts, animations, pictures, storytelling, memories and a plurality of textual genders. Moreover, Quarentuni has the intention of reducing the gap, not only between the students and teachers but also, between parents, staff, managers and the whole school community, seeking to promote education in a distinctive and comprehensive way.

Once we used Quarentuni, our project was concerned about presenting *feedback* for the productions that the students posted in the virtual environment. Through this platform, we intended an interdisciplinary work that aimed especially at the recovery of the contact with the students, leading them to a cognitive mobilization and re-adaptation with the school.

The didactic-pedagogic interdisciplinary work started through a huge acknowledgment area which was articulated by the teachers of Nature Sciences and Math, shaping contingently the area of Nature Sciences and Math (NSM). In this area, were posted activities through “Tracks” of acknowledgement, relating all courses inside one specific content.

The interdisciplinary teaching was structured from the perspective of Project Based Learning (PBL). According to [Nogueira \(2008\)](#), the PBL inserts itself on the active methodologies, which is intended to contribute with the students’ learning, through “dynamics, interactive activities, which explores the curricular contents on an attractive way, valuing the abilities of each individual, always aiming at solving problems” ([Martins & Müller-Palomar, 2018: p. 28](#)).

The process of teaching and learning is a complex system of interaction and information trades between students and teachers. In our work, all the process of teaching and learning was taken remotely and through Quarentuni, concerning study and acknowledging how the student’s learnings take place. We were influenced by the French perspective brought by [Fernandes \(2008\)](#), in which the top of the teaching and learning process is the pedagogical action that fosters and develops the student’s autonomy and the capability of understanding his own construction process of learning. And the teacher is only a facilitator of these students’ processes. Therefore, we understand the evaluation as an action in which the learnings are verified.

In order to build insights about current matters needing attention, we articulated the knowledge of each discipline. Among the topics covered are COVID-19, Artificial Intelligence, Food, and Life. As mentioned previously, we chose to use formative *feedback* as an instrument for evaluating student learning.

#### **4. Feedback and Students’ Answers Analysis**

The first project of the NSM area works with the COVID-19 thematic. There are

seven “gears” that explored this theme from the contributions of each of the subjects, going through the interpretation of the first graphics with the data of the cases of infection and deaths in the pandemic, the nanometric structure of Sars-Cov-2, the use of alcohol gel, alcohol 70% for hand sanitizing, and sanitary water for the areas sanitizing, amongst other activities.

Our effective work consisted on the tabulation of the students’ given answers to the questions formulated by the teachers, to build and give *feedback* about these answers. We gave *feedback* pointing out the advances, the understandings, prizing the thinking and leading adjustments for the incorrect or incomplete answers and also signaling the importance of not committing plagiarism. Those *feedback* are treated by the [National Council of Teachers of Mathematics \(NCTM, 1995\)](#) as a strategy for the formative evaluation.

The following shows one of the interdisciplinary activities and the types of *feedback* given for certain student responses. We selected Track 5, which has the intention to explore the theme “Life”, focusing on planet Earth. [Figure 1](#) shows the beginning of this “track”, in which each “gear” is the contribution of the disciplines that involve the NSM area.

The Mathematics field was responsible for the second gear ([Figure 2](#)) titled as “Life, the biodiversity and the Pantanal”, focused on the Pantanal, a biome, localized in Bolivia, Brazil and Paraguay. In this gear, teachers chose Pantanal because of the droughts that led to wildfires, in the year of 2020. In this gear, there is a lot of news, statistical data from Brazilian Institute of Geography and

The image shows a screenshot of a forum post on the Quarentuni platform. The post is titled "10/16 to 10/31 - TRACK 5" and is categorized as "Adventurous". The text of the post discusses the theme of life on Earth and introduces a "LIFEQUIZ". Below the text is a graphic titled "TRILHA 5 ENSINO MEDIO" and "CIÊNCIAS DA NATUREZA E MATEMÁTICA". The graphic shows five gears numbered 1 to 5, each representing a different topic: 1. Biodiversidade, 2. Pantanal, 3. Efeito Estufa e a Vida, 4. RUAÇÃO e Efeito Estufa, 5. LIFEQUIZ. The graphic also includes the text "1001", "1002", and "2001".

**Figure 1.** Analyzed activity on Quarentuni.



## Life, biodiversity and the Pantanal

Updated: Oct 16, 2020

We are now going to explore even more about the existing biodiversity in biomes, highlighting the debate about a Brazilian biome, which is the Pantanal.

But why choose Pantanal?

You must be following in the news the fight that firefighters and volunteers have been fighting to try to quell the fire that has been burning for weeks in the Pantanal. For this reason, in this gear, we are going to discuss this threatened Brazilian biome.

### What is the Pantanal?

According to information on the Ministry of the Environment website, "the Pantanal biome is considered one of the largest continuous wetlands on the planet. This continental biome is considered to have the smallest territorial extension in Brazil, however this data in no way detracts from the exuberant richness that the referent biome harbors. Its approximate area is 150,355 km<sup>2</sup> (IBGE, 2004), thus occupying 1.76% of the total area of the Brazilian territory. In its territorial space, the biome, which is an alluvial plain, is influenced by rivers that drain the Upper Paraguay basin".

**Figure 2.** Track 5—Gear 2.

Statistics—IBGE, BBC and Intercept Brazil videos. Beyond proposing reflections about this biome and the factors that intensified the wildfires. The questions proposed in this activity (**Figure 3**) have the purpose of encouraging critical thought, developing the argumentative skills, problem solving, mathematical thinking, text interpretation and creation of intervention proposal, characterizing itself as an interdisciplinary activity.

Based on these questions, we gathered the students' answers and, through tabulation, we built *feedback* for each one of them, all of them were posted on the platform. And then, we analyzed some commentaries and their *feedback*.

**Figure 4** shows a student that had an excellent performance answering the questions, he had a good argument and justification for the degradation of the Amazon Forest and the Pantanal wildfire, and even correctly answered the asked calculus on question 2, about how many soccer fields are equivalent to the devastated area. This way, our *feedback* was a prizing of his answers, instigating him to go deeper on his proposals.

On **Figure 5**, the student also answered correctly but, different from the previous student, she made a very approximate calculation of the second question, leaving it incomplete. Thus, our *feedback* was to understand her logical-mathematical thinking, to ascertain the used method and how did the student get this result. Moreover, we chose to comment about the other topics, through more questions, fostering her argumentation, since the student approached important topics.

**After these discussions, let's go to some reflections:**

1) It is said that the degradation of the Amazon Forest directly impacts the Pantanal biome, especially the current problem of fires aggravated by drought. Research and formulate a text that connects deforestation in the Amazon Forest with the issue of drought in the Pantanal.

2) In one of the videos (the one from the BBC news agency) it says that the total devastated area of the Pantanal is in the order of 2.9 million hectares. We ask:

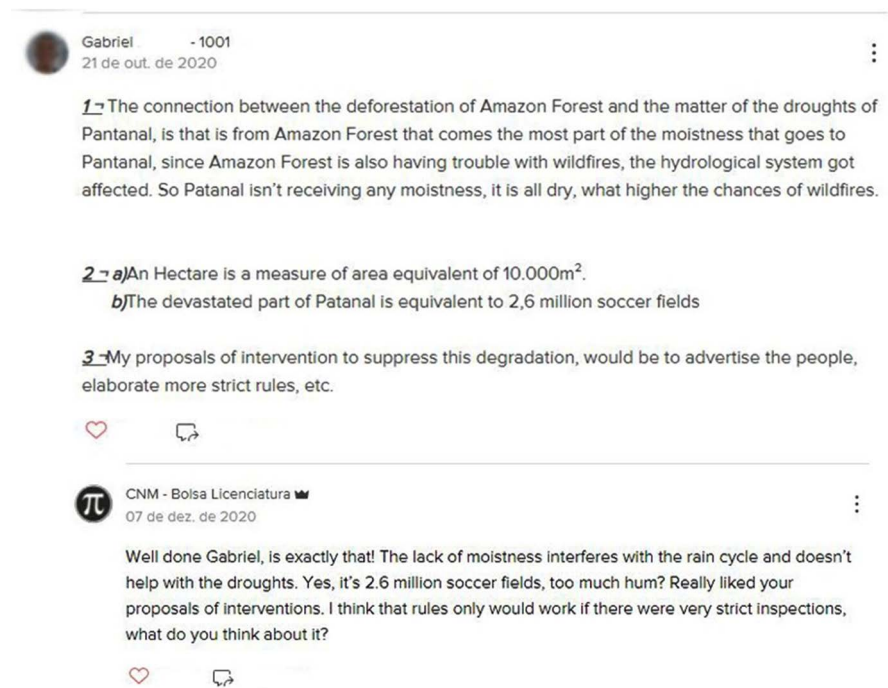
a) what is hectare?

b) knowing that a soccer field measures 1.08 hectares, how many soccer fields are equivalent to part of the devastated Pantanal.

3) Considering all the discussion raised here and your impressions, what would be your intervention proposals to contain this degradation in the Pantanal and also in other Brazilian biomes? Write free text. Take into account the text brought and also the videos contained in this post (videos 1 and 2).


**Post from the Natural Sciences and Mathematics area**

**Figure 3.** Proposed questions on Gear 2.



**Figure 4.** 1<sup>st</sup> Feedback.

There weren't correct answers only, but also incorrect or incomplete ones, as we looked for represent on **Figure 6**. At this one, the student wasn't able to develop a good argumentation and didn't formulate a text, as asked on the question, and he got straight to the point. In this case, our **feedback** aimed at prizing his answer and the fact that he tried to answer the questions, proposing him some new questions, so he could be able to develop better his answers, showing us his whole thinking, knowledge and learning.


 Izabela 1001  
20 de out. de 2020

1 - I believe that the degradation of the Amazon Forest directly impacts the pantanal biome, because of the fact that the amazon forest has the bigger concentration of moistness, which the winds take its moistness rain-shaped to the other areas of the country. If the Amazon is on fire, there's no moistness, and yes, a dry weather, making the Pantanal biome, that is also having wildfires, keep them. This way, causing the biggest deforestation of the region and changing the country's weather.

2a - Hectare is an agrarian measure of unity.  
2b - Something around 2 million.


3 - They should start an environmental awareness campaign, apply severe penalties, and invest in these forest conservation areas. I believe that many actions should be taken by the government, but as our government favors the wealthier ones, I think that it is hard to happen, even because the ones who have more money in our country are the owners of farms. So, if we don't have the government, I think the population should start to raise awareness by themselves, notice that it isn't only killing the place where they live, but also, themselves.

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 CNM - Bolsa Licenciatura  
07 de dez. de 2020

Excellent research Izabella! Remember: Not only the wildfires on Amazon Forest, but also the deforestation contributes to this situation, damaging the moistness, consequently, the rain cycle. Corresponds to something around it, but a little bit more than this, how did you calculate it? Very good proposals of intervention, people really need more education and awareness! As you already said " The ones who have more money in the country are the farm owners' ", do you think that applying more severe penalties would help? What kind of penalties? Excellent idea, the important discussion about people start to make a move by themselves and realize, through awareness, that they're killing everyone. Really strong words.

Figure 5. 2<sup>nd</sup> feedback.

 ryan (1002)  
18 de dez. de 2020


1 - Because Amazon Forest distributes moistness to Pantanal.

2 - Hectare is a measure unity used on farm areas

2b - A little bit more than 2 million

3 - More strict rules of environmental protection.

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 CNM - Bolsa Licenciatura  
21 de dez. de 2020

Well done Ryan! The Amazon Forest is indeed very moist and with the rain cycle, it handles to distribute water to many regions, like Pantanal. So, when the wildfires and the deforestation of the forest happens, it becomes dryer and interferes with the rain cycle, damaging Pantanal. It is equivalent to something around 2 million soccer fields, but something more than this. How did you calculate it? Try again using the rule of three! And how would you apply these rules? What rules, for example? Tell us more about your idea.

Figure 6. 3<sup>rd</sup> feedback.

Besides these comments, as we're on a turbulent remote learning, unfortunately we couldn't completely avoid plagiarism. However, we gave **feedback**

(Figure 7) that makes the student re-think and reflect about their own acts, allowing them to have another opportunity of answering the questions, based on their own point of view, completing the given answer. We tried to make them comprehend that copying something from the internet or from a classmate isn't a synonym of learning and we're interested in their development, learning, and knowledge acquired by the content we shown.

We sought to evaluate these comments in the service of student learning, training and promotion of citizenship, based on Hoffmann (2001). Supported by the theory of this Brazilian researcher, we considered that, instead of alienating, through *feedback* we could mobilize the search for the meaning of the knowledge as a way of pedagogical intervention to improve students' learning.

From this *feedback*, we tried to bring to the student a way of showing that we are concerned about their development and the acquired knowledge, through the activities. Likewise, this was a way to investigate, clarify and arrange their ideas, allowing an improvement of the strategies and techniques of learning, establishing goals, self-regulation, task planning, self-control, monitoring and reflection. Here we are considering the definition of self-regulation by Perrenoud (1999), which consists of: "a person's abilities to manage their projects, their progress, their strategies in the face of tasks and obstacles" (Perrenoud, 1999: p. 97).

Another perception was that the given *feedback* had a huge impact on the synchronous classes, since the students participated actively, clarifying their doubts and commenting about the information and questions given through the *feedback*.

Besides the benefits for the students, *feedback* showed us evidence about the learning of each one of them, allowing us to identify specific contents that weren't

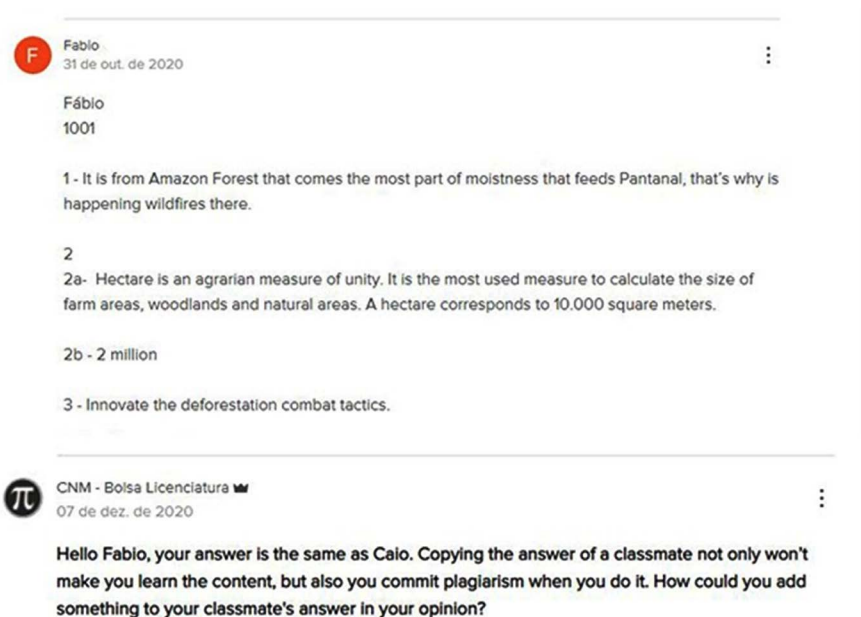


Figure 7. 4<sup>th</sup> *feedback*.

really clear for them. On the shown figures, the given *feedback* gave us *feedback* about the mathematical content proposed on the question, since many students didn't answer correctly or didn't clarify how they got the results. Therefore, we managed to give this information to the Math Teacher, so he could, in the synchronous classes, debate about the contents treated on the "knowledge trail".

## 5. Final Considerations

As mentioned in the introduction, it was a period of learning and challenges, not only for teachers and students, but also for parents, managers and the whole community. In these circumstances, the proposal of this project was designed based on a better way to evaluate students remotely. Thus, we adopted a formative and leading evaluation, through positive and evaluative *feedback*, which stimulated the student's development.

We understand that formative *feedback* is an important pedagogical strategy for the development of self-regulation and self-assessment by the student. In terms of what Perrenoud (1999) puts it, *feedback* encourages the construction of student autonomy in relation to the educational processes he experiences.

Thus, in order to implement the formative evaluation proposal with the mobilization of the use of formative *feedback*, we used the platform provided by COLUNI-UFF, where our work and the monitoring of students were developed. We listed the answers so that we could give *feedback* to the entire class and evaluate class performance in general, making it much easier to identify some content that wasn't clear. In addition, this way of evaluating allowed the individual identification of gaps in learning and the individual *feedbacks* constructed were directed towards pointing to each student the learning built and those that had not yet consolidated.

This project had a great impact on the initial training of undergraduate scholarship holders in Mathematics at UFF, since many forms of evaluation were discussed, based on theoretical, important for training as future teachers.

In future studies, we intend to continue the project discussed in this article, analyzing for a longer period of time, the performance, development and teaching process of each student. In addition, we had the idea of tabulating the students' responses after the *feedback* given, so that we could analyze their knowledge before and after the *feedback*.

We understand, as suggested by Fernandes (2008: p. 360), that our methodological approaches as future teachers can be hybridized in relation to evaluation. This is how we intend to reformulate the role of the same instruments, which are required in primary school, through a formative perspective.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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