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Investigative-Action Practices in Science Teaching during the Supervised Internship at the Goiano Federal Institute

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Abstract: ***This article presents the results of an action research type of search, whose focus is the Supervised Curriculum Internship (SCI), of the Degree in Chemistry of the Federal Institute of Education IF Goiano. The objective was to develop action research practices using different didactic-pedagogical strategies, through the bias of the active methodologies, in the teaching-learning process of 7th grade Science. With a qualitative approach, initially a diagnosis was made about the school, and later didactic actions were developed based on action research, with the use of several didactic-pedagogical strategies, which range from the development of didactic games, the realization of projects by the students of elementary school, visits to the laboratories of IF Goiano and participation in Science exhibitions. For the diagnosis, a questionnaire and dialogue with the class teacher were used, and in the data collection process of the actions developed, a field diary was used to rigorously record the entire process. The results highlight the involvement of the school in the realization and implementation of practices, as well as the active participation of students, signaling the protagonism in their learning process.***

Keywords: Science teaching learning. Didactic Strategies. Supervised Internship. Active methodologies

1. Introduction

Currently, there is an agreement in the literature on the need for teachers to use different teaching methods and strategies to make Science teaching more attractive and opportune the involvement of students, making them protagonists in their teaching and learning process. In other words, it is up to Science teaching to prompt students to problematize everyday practical situations in the light of the theoretical knowledge studied.

Studies show that the teaching employed in our days, sometimes, transmits visions of science that are notoriously different from the way scientific knowledge is built and evolved [2]. Impoverished and distorted visions that create disinterest, if not rejection, of many students and become an obstacle for learning.

For students to gain autonomy and greater involvement in the process of knowledge building, it is essential that teachers mobilise innovative teaching practices. These practices can be encouraged in different situations during the initial teacher training process. In this perspective, it is defended the insertion of the undergraduates in practices of initiation to research in training, so that they experience different learning from teaching to be operationalized in their future teaching practice [10].

From this formative point of view, the IF Goiano is already working in order to insert the research in the formation, to the extent that, in the Supervised Curricular Internship (SCI), the undergraduates develop projects of teaching and/or research internship, using several of the instruments of data collection of qualitative approach research, such as narratives, interviews, analysis of documents and observation, so that the regulation of internship of the IF emphasizes.

> The Supervised Curriculum Internship (SCI) for the Degree Courses of the Federal Institute of Education Science and Technology (IF), Campus Rio Verde is an integral part of teacher training for Basic Education and consists of the participation of the graduate in activities that articulate teaching, research and extension emphasizing the integral formation of the professional, consolidating in concrete situations of the educational environment the theory-practice and learning of teaching [5].

The insertion to research in the SCI raises the development of the graduate's critical and investigative gaze, showing itself to be of great value, because the research, the reflection on the situations of the school of Basic Education in the light of the theory studied, brings to light what would normally go unnoticed without theoretical input.

The SCI at IF Goiano, in the campus in question, is organized in 4 stages of 100 hours each, the first two being carried out in the final years of Elementary School and therefore the last two stages in High School, and is based on the development of research projects. According to Paniago et al., [10], the internship of the institution is organized as follows:

> The supervised internship regulations for chemistry and biology degrees are evidenced in specific regulations, with an effective workload of 400 (four hundred) internship hours, distributed over four school semesters. Of these, 200 (two hundred) hours must be spent in primary school between the 5th (fifth) and 6th (sixth) periods; and 200 hours in secondary school, between the 7th (seventh) and 8th (eighth) periods. In general, in the regiment of both courses, the hours are distributed between phases of observation, regency classes and teaching projects [10].

Based on the first 200 hours of the SCI, which contemplates the final years of Elementary School, it was sought to develop the internship with a view to researching the practices adopted in basic education school for the teaching-learning process of Sciences, as well as the subsequent proposal of some actions of intervention. Pimenta [11] describes that: "[...] as a field of knowledge, the internship takes place in the interaction of the training courses with the social field in which educational practices are developed. In this sense, the internship may constitute a research activity [...]".

In view of the above, the objective of this research, which is part of the actions developed by the EducAção research group of the Federal Institute of Goiás, was to develop practices of action research, using different didactic-pedagogical strategies through the bias of the active methodologies, in the teaching-learning process of Sciences of the 7th year of Elementary School. In the end, the aim was to obtain answers to the following questions: What didactic-pedagogical strategies can facilitate understanding, and awaken students' interest in science teaching and learning? How can the use of different didactic-pedagogical strategies, due to the bias of the active methodologies, help in the process of teaching and learning complex science contents?

1.1 Theoretical Aspects Underpinning the Research

One of the most aggravating factors, which makes Science teaching unattractive and seen as an obstacle for students, is the practice developed by teachers, who often reproduce ineffective and obsolete methodologies, limiting themselves to the use of the textbook as the only means of planning and teaching classes [2].

As a consequence, students tend to use memorisation to do well in evaluations, and consequently, after performing these, memorised content is discarded. It is perceived that there is no significant understanding of the contents studied, denoting that the contents, are the end and apex of their learning, however, Delphino [3] demystifies this, valuing the use of the contents taught in the classroom as a means to achieve learning.

> There is a paradigm shift from the passive learner to the active learner, where content is no longer the end of learning, but the means, as the end becomes the learning itself. The emphasis here is on making students committed to manipulating, applying, analyzing, producing and evaluating ideas. These methodologies, in general, commit the student directly with activities of reasoning and problem solving. As a result, we can have more confident and self-motivated students, with control of their own learning [3].

Another fragility to be pointed out refers to the methodologies employed in the teaching of Science by teachers, which translates into the passive action of the student in the construction of his/her knowledge, so that the reproduction of ineffective methods causes little or no positive impact on the learning of a large part of students. Thus, one of the challenges inherent to education stands out as the rethinking of new educational proposals that go beyond the instruction dictated by the textbook, centered on the teacher's words and the passivity of the student [12].

On the other hand, active methodologies can be cited, which encourage students to be protagonists in the construction of knowledge, abandoning the practices of the education bank, which has the student as a deposit of content transferred by the teacher [4]. In view of this, it is understood that active methodologies are pedagogical strategies to create teaching opportunities, in which students start to have a more active behavior, actively involving them in their learning process, performing activities that can help establish relationships with the context, the development of cognitive strategies and the process of knowledge construction [12].

The rethinking of these new proposals refers to the results described by Moran [7]. Students learn better, through relevant practices, activities, games and projects, than in the conventional way, combining collaboration (learning together) and personalization (encouraging and managing individual pathways) [7].

To guide new strategies for the teaching-learning process of science contents, it was tried to anchor them in the active methodologies, as they bring great benefits.

> Active methodologies are teaching strategies focused on effective student participation in the construction of the learning process, in a flexible, interconnected, hybrid way. The active methodologies in a connected and digital world are expressed through hybrid teaching models, with many possible combinations. The combination of active methodologies with flexible, hybrid models brings important contributions to the design of current solutions for today's learners [7].

Masetto [6] also contributes by highlighting that the active methodologies "are techniques, methods, resources and strategies that, thought of as instruments adapted to the different learning objectives, provoke and encourage the proactivity and autonomy of the students in their training". It is also important to work with the teaching-learning process from the perspective of active methodologies, to the extent that it encourages responsibility and autonomy of the students for the construction of their knowledge.

According to Freire [4], each individual builds his knowledge from lived experiences, making the learning process different for each student, so teaching should be motivating and instigating. Some tools can be used as support in this path, such as games, dynamics, experiments, use of audiovisual resources, among others. Playful activities are able to enhance the teaching transmitted by the teacher, as it makes the content more attractive in the eyes of students.

Another very engaging strategy, capable of bridging the content addressed with the everyday life of the student, is Digital Information and Communication Technologies (DICT), since digital media are very present in the lives of

students, so this tool enables a range of strategies to be applied in Basic Education. In general, it is possible to see that DICT and digital media have had a great impact on practically all segments of our society, of our life and, above all, on the development of scientific knowledge and advances in science [7].

However, in educational institutions, the presence of these technologies is negligible, and their potential is little explored. The same impacts and transformations visibly identified in other segments, such as the banking system, administrative processes, services and companies in general, are not yet observed in the teaching and learning processes, at different levels, from Basic to Superior [12]. It is important to pay attention to the preparation and coherence of the method chosen with the objective set. According to Paniago [9] "[...] in dealing with teaching practice the method is the way, and the direction to reach the expected objectives".

It is important to stress that whatever method is used in the classroom, it is essential that the teacher dialogues and urges the student to develop autonomy and responsibility for his/her learning. In this case, it is emphasized that there is no specific type of active methodology, on the contrary, any didactic procedure or artifact can be considered as an active method, as long as it values the student in the construction of his/her learning, being the protagonist, not mere coadjuvant. [12].

In addition to being concerned with the use of methodologies that would privilege the learner as the builder of his or her learning, this research sought to anchor itself in the principles of meaningful learning, considering that this is the one in which ideas expressed symbolically interact in a substantive and non-arbitrary way with what the learner already knows. According to Moreira [8], substantive means non-literal, not literally, and non-arbitrary means that the interaction is not with any previous idea, but with some specifically relevant knowledge already existing in the cognitive structure of the subject who learns [8]. Thus, it is of great advantage to the teaching-learning process to associate classes based on elements of students' everyday life and to apply different methods as support. For this, planning and organization is necessary in each of the stages, which in turn make up the research.

2. Research Methodology

In this qualitative approach research we anchor ourselves in the assumptions of action research, since this perspective, according to Zeichner [13], contributes to teachers in action and future teachers to develop theories about teaching and fight for social justice. This stems from the fact that action research provides strategies for teachers in training to get involved:

> [...] in the analysis of their own teaching practice, so that such analysis can become the basis for deepening and expanding their thinking and, consequently, to include a look at the social and political dimensions of their work. It can do this in a way that minimizes the degree of strategic obedience on the part of students in training and can begin to build an authentic commitment of teachers in training to work for social change in their classroom practice [13].

Among the data collection procedures, it was opted for observation with field diary recording, photographs, diagnosis of school reality, dialogue with the teacher and application of a questionnaire with the students. For the diagnosis, the researcher immersed himself for six months in the daily life of the school during the Supervised Curriculum Internship. This diagnosis consisted in the observation of the physical and pedagogical structure, the coexistence with students and staff during various moments in the school, such as breaks, teachers and parents meeting.

All observations were recorded in a field diary, describing the details experienced at the school. In this way, information related to the school's structure, location, teaching staff, students and experience in the classroom and in parallel activities such as recreation, the mode of evaluation adopted by the school, projects developed, textbooks, resources that the school provides detailed observations of day-to-day life at school, among other relevant aspects, have been included in the field journal. In addition, the field diary recorded the interventions carried out in the classroom with the application of didactic-pedagogical activities.

By means of a semi-structured questionnaire, it was sought to investigate 3 classes of 7th grade students out of a total of 120 students, some of the aspects in relation to learning the contents and aspects that interfere with the teaching-learning process for later planning and didactic actions in the classroom. Through the dialogue with the regent teacher, the identification of possible difficulties faced in the process of teaching and learning science, as well as the methods used, was sought.

After the diagnosis, which took place through collective planning, under the guidance and supervision of the teacher trainers, the action plan to be developed with the students for six months was prepared. At all times, the dialogue with the supervising teacher, holder of the class, aiming at the alignment of the actions to their teaching practice, as well as with the 3 classes of the 7th grade students, after all, the didactic actions were put into perspective in the active methodologies, which presuppose that the students get involved in the process of their learning. According to Masetto [6], the active methodologies "are planned by the teacher in partnership with the students, provoking active and critical participation and posture".

3. Results: What the Data Indicate

There were several didactic actions carried out in the development of the research, so that, for the purpose of analysis, the following will be highlighted: 1) making the diagnosis; 2) awakening the interest of students in research, through the development of teaching by projects; 3) the use of games as strategies for teaching the Solar System; 4) use of the food pyramid as a didactic strategy.

3.1 Making The Diagnosis

As stated above, a diagnosis was initially made in order to understand some of the aspects of students in relation to learning the contents, aspects that interfere with learning for later planning and interventions in the classroom, considering that when preparing a teaching plan or planning a lesson, it is important for the teacher to have some pedagogical concerns and to ask: "in what context am I working? What kind of student do I want to graduate? Why teach this or that content? Who will I teach? What will I teach? How will I teach? How will I evaluate?" [9].

The diagnosis was important to know the school before the practice, since besides the physical and structural perspective of the school, it was sought to observe issues related to teaching-learning, such as methodologies already adopted by the teacher and programmatic content based on the curricular parameters of the state, to later choose the didactic strategies appropriate to the reality of the students and their pace of learning. It is important to highlight that each child and young person has a form of learning, and the speed of synthesis and assimilation of knowledge is gradual, that is, each at its own time and pace.

As Pimenta and Lima state [11]: To make the diagnosis we need to go beyond statistics and numerical data. We need to check the school alive, working "[...] Thus, the diagnosis requires a careful look to see what the reactions of the school population are to changes, innovations and other events" [11].

Certainly, the social and cultural environment of students reflects directly on their teaching-learning. Therefore, it is fundamental to know them before any intervening action [9]. From this perspective, when planning, the role of teaching is highlighted, why teaching this or that content, and what is fundamental, considers the knowledge of the students, instigates them as to the responsibility in their teaching-learning process so as to have autonomy in the construction of their knowledge. Furthermore, this pedagogical posture favors dialogue, the sharing of teachings between teacher and student, learning to learn from both, as Paulo Freire said:

> In this way, the educator is no longer what only educates, but what, while educating, is educated, in dialogue with the learner who, while being educated, also educates. Both thus become subjects of the process in which they grow up together and in which the "authority arguments" are no longer valid. In order to be functionally authoritative, you need to be with the freedoms and not against them [4].

All these analyses concerning the students are necessary for significant learning, because according to Moreira [8] "It is important to reiterate that significant learning is characterized by the interaction between previous knowledge and new knowledge, and that this interaction is non-literal and non-arbitrary". Moreira [8] still says that "in this process, new knowledge acquires meaning for the subject and previous knowledge acquires new meanings or greater cognitive stability". In other words, the construction becomes significant to the student, when his previous knowledge is considered.

The results obtained through the questionnaire with the students indicated that they come from socially less favored classes, with some helping the parents at work, the parents have low income, many students live with grandparents or uncles and many do not have access to means of information and communication. In general, 7th grade students are immersed in the same needy socioeconomic universe. From the point of view of learning Science, it was perceived that this subject is not very attractive to students, considering that most of them signaled to like Physical Education more in view of the activities that are developed. About the strategies and didactic resources, the students demonstrated that they liked more dynamic classes, practices that involved them in their teaching-learning process, such as dynamics, games, movies, theater, among others. However, when observing the teacher's classes, it was noticed that she did not use differentiated didactic-pedagogical resources, taking into account the use of the whiteboard and textbooks to contribute to her classes, perhaps this is one of the explanations by which the discipline of science was not pointed out as attractive or even preferred by the students when answering the questionnaire.

About the didactic-pedagogical resources for science teaching in the final years of elementary school, it was noticed that the school has several equipments and materials, such as: Data show, television, white board, prototypes of the human skeleton, several didactic books as well as literary, school materials and computer lab with computers, the latter being little used, due to the small number of computers in operation.

Despite the various teaching resources, the dialogue with the teacher revealed that the school does not have teaching resources and environments that favour the teaching and learning of science in a more attractive way, since the school does not have a Chemistry or Biology laboratory, and other spaces that favour practical, experimental classes, leaving the teaching exclusively in the classroom. Except for the space dedicated to the production of a school garden, but very little used by teachers.

About the contents to be addressed in the interventional practices, the teacher suggested the theme nutrition, as it would be in the curricular matrix in the third bimester and favored a transversal work of the contents, approaching several concepts of science teaching foreseen in the curricular guidelines of the State of Goiás, such as healthy food, nutrients, among others. According to the teacher, the work with projects should be linked to the proposed curriculum, considering that the teaching system requires that teachers comply with what is established. In addition, the teacher reported that the solar system was also a subject that was difficult for students to understand, given the abstraction it requires and the absence of didactic resources to make learning more meaningful, and that it would be possible to fit into the intervention activities of the research. In this way, some of the didactic actions done with the students will be presented below.

3.2 Students in Basic Education as Researchers: Working with Projects

During the research, the students were encouraged to develop projects with the aim of problematizing their reality, developing the posture of researchers and autonomy in the construction of their learning, according to the assumptions of active methodology [6]. The work with projects is considered a didactic strategy that allows the involvement of the student in the construction of their learning [7-9]. Thus, one of the didactic actions used in action research was the work with projects in which it was concerned to encourage them to get involved in the process of building their learning, to question, to problematize and to propose a solution as it proposes [9], which justifies the use of work with projects as a didactic teaching strategy.

One of the projects, entitled "School Menu", consisted of the collection and analysis of data by the 7th grade students on food at home and analysis of the school menu. This analysis happened in two moments. First, all students in class were asked to check the main ingredients used to prepare the food consumed in their homes at the main meals of the day (breakfast, lunch and dinner), and then, in class, the menu was analyzed, with the food pyramid as the base. Nevertheless, students were able to extend their studies beyond the classroom and organize their food consumption, perform the calculations of the amount of food they consume, as shown in table 1 .

Table 1: Food cited by students as gifts in their main daily meals.

Daily Meals	Food present at the meal
Breakfast	
Morning snack	
Lunch	
Afternoon Lunch	
Dinner	
Supper	

Source: Personal file, 2017.

After completing table 1, students were asked to complete table 2, as shown in the model below, to check which groups of food are present in the daily diet, as well as the amount of portions.

Table 2: Analysis of the daily family menu

Food groups	Number of daily portions
Group of breads, cereals and pasta;	
Vegetable and fruit group;	
Milk and dairy group;	
Meat and eggs group;	
Fat and sugar group.	

Source: Personal file, 2017.

Other activities were worked on, such as: 1- Make a list of the food you like (or eat). Then separate the food; according to their origin, the type of nutrient and the function it performs in our body. 2- Make another similar list only with the food you don't like. Are they missed in your food? Do you eat other types of food that can "replace" those you don't like? It is noted that the teacher could have explored this theme much more, which was not possible in view of the little available for Science classes and also considering that she needed to work on other themes in the curricular matrix of the 7th grade.

The didactic actions worked in the perspective of action research were relevant for the students and for the team involved, teachers and students of IF and the Elementary School, because, besides providing an opportunity for collaborative work, it encouraged the students to develop an analytical and investigative position in relation to something so indispensable for their daily life, in the case described, food. Therefore, the choice of the strategy to be employed needs to have a collaborative character to link the school environment, as well as the learning received in class, with the daily life of the student, Paniago [9] emphasizes this importance by making a relationship with the choice of the right strategies.

> Thus, I reaffirm that the choice of didactic-pedagogical strategies, as well as didactic resources, depends on the observation of some elements: the objectives, contents, the way the student learns and his knowledge inserted in his socio-cultural, political, economic and environmental universe - the purpose of teaching with a political and pedagogical act that is committed to the formation of critical, reflective and investigative people [9].

In a second moment of this didactic action, the students were guided to collect data regarding the main ingredients that constitute the school's snacks each day of the week, and to check, according to the school's financial conditions, whether the snack offered is satisfactory. In the case of the menu analysis, all the students were involved, however, for the purpose of presenting the results in a Scientific Show organized at the IF Goiano, and according to availability, the deepening was done in the second shift. To represent the students, two 7th grade students, João and Marta (fictitious names), will stand out in this text. Then, under the guidance of the first author of this article, the students collected the necessary data to check the snack, whether it was satisfactory in terms of nutrients or not.

Meetings were held with these students, taking advantage of the school library space, to clarify doubts and discuss. That helped in a certain way to understand their view regarding the snack. As verified and registered in the field journal (Silva, 2017, p. 8), it is worth pointing out that the help of the maintaining entity does not really offer great conditions to offer a more elaborate snack and, besides that, the school buys everything through bids, so there is no possibility to choose the places with the best offers.

After the data collection and analysis, the students were guided on how the work would be presented. Then a banner was developed for presentation at the science fair. The picture 1 shows the culmination of the project that took place in the presentation of the work at the science fair.

The picture 1 shows the culmination of the project that took place in the presentation of the work at the science fair.
Source: Personal file, 2018.

It was realized that the work with projects made it possible to involve students in the process of building their learning and insertion in the world of science, which certainly would have been more relevant if there had been more time to spare for this practice.

The presentation of the results at the Science and Culture Exhibition organized by IF Goiano was significant because, besides enabling students to present their work, it allowed them to visualize other presentations and acquire new knowledge. It was found that the students were not intimidated by the presence of the evaluators, on the contrary, they were prepared and aware of what they should talk about, a fact reported in the first author's field diary, as, "surprising the posture of those who sought to study the banner model that I previously passed on to them, and as a result, I observed great resourcefulness during the presentation in front of the science fair evaluators" (Silva, p.7, 2017).

The experience was gratifying for those involved, because for the students it somewhat broadens their horizons and can blossom the desire to continue with their studies, considering that a major problem faced at the school is the lack of perspective of the students regarding their professional future. One can see how much the students correspond positively when there is effort employed, so the autonomy given to the students involved in the activity has enabled them to play a leading role in the construction of their knowledge. It is worth noting that "research-based learning provides conditions for students to be more active and engaged in teaching and learning processes, such as research-based learning" [12]. For the undergraduate students, the IF Goiano's training teachers and the basic education teachers, the actions developed in this research gave rise to reflections and collaborative actions in order to strengthen the research practices in education and teaching at the IF Goiano.

Finally, it should be emphasized that when adopting an active methodology, the teacher's posture must be in line with the method used, so even if the method comes as an end result to facilitate the teaching-learning process of the students, these methodologies directly encompass the teacher's posture in the classroom. Delphino [3] says something very pertinent about this.

> From this perspective, we cannot confuse Active Methodologies with mere techniques applied in the classroom. They represent, fundamentally, a change in the profile of the teacher and the student. The latter has the main role, since it becomes an agent of his own learning through tasks that stimulate the discovery of metacognitive abilities that will be applied by him consciously in his own learning afterward, becoming a resulting practice [3].

3.3 The Use of Digital Games in the Teaching-Learning of the Solar System

Because it was identified as a difficult to understand content, sought to insert games in the teaching-learning process of the content Solar System. For this purpose, electronic games involving several themes were produced at the Rosa dos Saberes Education Center of IF Goiano (a space that integrates research, teaching and extension activities on education and teaching by the authors of this text). The games were developed on the Construct3 platform, all from an environmental education perspective. All games are available for computers and smartphones, on the site of the Rosa dos Saberes Education Center, whose link is:

https://sites.google.com/view/prticasdeensinoinovadoras/projetos/projetos-de-extens%C3%A3o/jogos-eletr%C3%B4nicos.

Manual games and mockups were also produced. There were several didactic actions carried out with the games, however, here we will elucidate one.

Because it was educational software, the use of computers was indispensable. In the school diagnosis, it was observed that the school had a computer laboratory, however, when carrying out the activities, it was perceived that the quantity of computers would not meet the demand of students. In order to overcome this obstacle, a technical visit of the participating students to the IF Goiano was promoted, so that without further inconvenience, the proposed intervention proved to be very accessible, due to the proximity of the two educational institutions.

In order to carry out the practices, a priori, the students were stimulated to research about the Solar System and in addition, there were clarifications about the subject and revision of concepts that the students had already obtained contact with before. A certain mastery of them was perceived in what was explained as, for example, the position of the planets in relation to the Sun, geocentrism and heliocentrism, among others, a fact that evidenced a continuity of the work already done by the supervising teacher.

After the end of the lecture, it was followed by an animation with the aid of a data show, representing the dynamics of the movement of the planets and the software was applied with emphasis on the theme Solar System. The students were

very attracted to the game, so that they were able to develop a logical reasoning regarding the challenges of the game.

It is known that technologies have become more and more present in the lives of young people and adolescents, taking advantage of this, the useful and the pleasant were joined. It is also worth mentioning the great challenge of teachers nowadays to reconcile digital media in their classes, since most of them are prohibited in the classroom. Valente et al. says something interesting about this:

> It is important to consider the social practices inherent to digital culture, marked by participation, creation, invention, opening of the spatial and temporal limits of the classroom and formal spaces of education, integrating different spaces of production of knowledge, contexts and cultures, everyday events and knowledge of different natures. The exploration of these characteristics and brands demands reconsidering the curriculum and the methodologies that place the student at the center of the educational process and focus on active learning [12].

It is necessary to reconsider that, with the eminence of new technologies, the repression of their use in the classroom becomes unfeasible and problematic, causing only stress for both sides. The rupture of issues arising from traditionalism and the act of rethinking methodologies that encompass DICT become revolutionary and striking in the lives of students and in the construction of their knowledge.

It was noted that students were excited and happy to be in a different environment, even though it was during class time. Certainly, the use of a new tool in this case, an educational software, has turned their experience into something never before experienced when it comes to teaching and learning.

For each new planet explored in the game, new information was introduced, pertinent to the known characteristics of the planets, this proved to be of great value, because it gave more credibility to the tool, since besides having the theme Solar System, it made possible the conceptual exploration in its composition. Fact portrayed in the first author's field diary "Finally, after applying the games, a conversation took place with the students about their perception of the solar system in relation to the game. They have given us pertinent contributions in this regard" (Silva, 2018, p. 12). These contributions were important because the game was being tested at the time of this didactic action and improvements in the game and even in the aesthetics of the characters could be inserted into the educational software. Figure 2 shows the culmination of the activity.

Figure 2: Practice with educational software and expository lesson. **Source**: Personal file, 2018

3.4 Reaffirming Solar System Concepts by Means of an Informative Model

In addition to the electronic games, it was decided to propose to the students, the collaborative construction of an informative model, involving the theme Solar System with didactic materials made available by the Interdisciplinary Laboratory for the Formation of Educators (ILFE), which makes up the Rosa de Saberes Education Center. In the teaching process, the initial aim was to dialogue with the students, questioning the knowledge already acquired and taking up basic concepts previously studied. In sequence, the students created an informative model with the help of Styrofoam board, Styrofoam balls, inks of various colors, sulphite paper and glue. They built a model, where the planets that make up the Solar System were arranged and just below each one of them there was an information sheet about the characteristics of the stars. Figure 3 shows the result of this practice.

Figure 3: Informative model with the theme Solar System. **Source:** Personal file, 2018.

A very significant moment, which enriched the didactic actions worked on, was the opportunity to present the informative model in a science fair at the 70th Annual Meeting of the Brazilian Society for the Progress of Science (BSPC) held at the Rio Verde Campus. In this event, the researchers were able to socialize the results of the actions developed signaling the importance of training in and through research in initial teacher training courses.

The results indicated that a didactic strategy has the potential to facilitate understanding and awaken students' interest in science teaching and learning, when it respects their previous knowledge and encourages new learning from classroom experiences. It is also worth mentioning that every didactic strategy needs prior planning, it must be correlated with the objectives of the activity and consider the

largest possible number of stakeholders, who, in turn, demonstrate whether it is viable or not.

It was also realized that the use of different didactic-pedagogical strategies can help in the process of teaching and learning complex science contents, when they are applied as a complement, synthesis and aggregation of knowledge, interventions should not be placed in the foreground. They will have positive effects on the quality of the teaching-learning when they are applied in such a way as to establish a theory-practical relationship, so that students analyse the practical situations of their experience in the light of the knowledge studied.

3.4 Didactic strategies with the food pyramid

On the subject of nutrition, it was decided to carry out an activity involving the food pyramid, which, in turn, consisted of the explanation of basic concepts on nutrition and the subsequent construction of food pyramids on cardboard with the students. It is necessary to point out that the main thread of the active methodology is the student's involvement in his/her learning process, with an active attitude, experiencing and facing head-on all the challenges as a sign of commitment and responsibility for the construction of his/her knowledge. "Active learning increases our cognitive flexibility, which is the ability to alternate and perform different tasks, mental operations or objectives and to adapt to unexpected situations, overcoming rigid mental models and inefficient automatisms" [7].

For the development of the practice of the food pyramid, subsidies were sought regarding the theme nutrition worked on in the 3rd bimester. It is worth noting that although this practice has been highlighted, there are other activities adopted, which in turn serve the same purposes, for example, one can quote the mock jury, visit to the school pantry and reading food labels, because these are simple interventions, but have a relevant impact on the teaching-learning process of students.

Together with the students, the sketch of 15 food pyramids on sulphite paper was built, and they pasted images of the specific foods of each gap in the pyramid.

To this end, they were asked in advance to bring pamphlets of supermarket promotions, to make cuttings of food present in the food pyramid for sequent collage. The practice consisted of a brief dialogue on the nutrition content and consequent construction of the food pyramid with the students. In all the classes, it was found that few students took the pamphlets ordered beforehand, but printed food designs were taken for the students to glue if they had not taken the pamphlets. This strategy of carrying out printed food designs was crucial to the success of the practice, as it allowed the practice to be carried out, as stated in the field daily (Silva, p.1, 2017).

Since this is a theme very much linked to the everyday life of the students, in which they already had a certain mastery, it was possible to perceive their ease in carrying out the proposed activity, demonstrating that the practice worked as a synthesis of the knowledge they already brought from their life outside the school, as in the contents already studied to, as well as the aggregation of new knowledge from what the students in question already mastered.

The significance in learning is important for the constitution of student autonomy, as students build on what has been added to them with this proposed practice, as Moreira says:

> Therefore, meaningful learning is not, as one might think, that which the individual never forgets. Obliterating assimilation is a natural continuity of meaningful learning, but it is not a total forgetfulness. It is a loss of discrimination, of differentiation of meanings, not a loss of meanings. If the forgetfulness is total, as if the individual had never learned a certain content it is likely that learning was mechanical, not significant [8].

Figure 4 shows the practice being performed.

Figure 4: Students of the State College, participating in the practice of the food pyramid. **Source:** Personal file, 2018

4. Final Considerations

In developing this research it was realized the importance and necessity for teachers to mobilize in the classroom several actions, didactic strategies that allow the participation of students as protagonists in their learning process. In this process, it is essential, a priori, to make the diagnosis in order to know the educational context of the school, the socio-cultural and economic context of the students, their learning needs, in order to then plan didactic actions of investigation-action that contemplate their different forms of learning and that are in line with the physical and pedagogical conditions of the school.

From the action research practices carried out, having as anchorage the active methodologies, are highlighted the practices with: the food pyramid, the construction and development of projects by students in the 7th grade, and the work with the Solar System as practices that have provided students with greater involvement in their teaching-learning process, signaling the assumption that active methodologies can promote a teaching-learning in which students are protagonists and take responsibility for the construction of their knowledge.

In view of the results expressed in the action research practices in science teaching in the field during the Supervised Internship, it can be seen that teaching practices, being previously planned in a collaborative way, with teachers and students tend to have a high probability of occurring successfully, because they provide the learning so that the student is the protagonist of the teaching-learning process.

Finally, developing practices in a collaborative manner, in line with the subject already applied by the Science teacher and by observing the interaction of students, was fundamental for the comprehension of the teaching profession, because it can be understood that the teaching activity requires professional knowledge to teach with action practices thought and planned from the demand of the school and with the use of active methodologies signal positive results in the teaching-learning process.
Moreover, with the realization of this research during the Supervised Curricular Internship, it became possible to approach the undergraduate still in formation with the identity of teacher / researcher, highlighting the importance of pedagogical research in initial training for teaching, being the Supervised Curricular Internship a moment that makes possible to problematize the practices of teaching for the teaching of Science and seek new possibilities of strategies and didactics to be used in the classroom.

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