

PRESENTATION OF A PLAY DEVELOPED BY STUDENTS OF THE TECHNICAL COURSE IN CHEMISTRY AT ETEC DE SÃO MANUEL - SP, SIMULATING AN EPISODE OF THE SERIES: “AEROPORTO SÃO PAULO”

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Abstract: Chemistry is a science considered difficult to understand, mainly due to the calculations involved, technical terms with “unfamiliar” names, lack of licensed teachers in chemistry, among other factors. The use of the active methodology with the effective participation of students is much more effective in consolidating concepts, including in the chemistry area. Numerous television programs address forensic science topics (eg: CSI, NCIS, Bones, Criminal Minds), but with restricted access (pay TV), which arouse the interest of countless young people for the use of chemistry in solving crimes, but do not show details important aspects of the techniques used. The objective of this work was to motivate students of the technical course in chemistry, through the use of an active methodology, demonstrating that it is possible to learn chemistry in a different way from traditional (expositive) classes. For this, students from Etec Dona Sebastiana de Barros, in the city of São Manuel-SP, watched some episodes of the series “Aeroporto São Paulo”, in which the suspects were approached by Federal Police agents and after an interrogation and search of their luggage, the experts detected through the Scott test, positive reaction for cocaine (blue color). Thus, the students had to prepare and rehearse a play simulating the cocaine detection test (Scott test), similar to the one on the series Aeroporto São Paulo, and present it during the reception week for new students on the course. In current teaching practice, the use of an active methodology is advocated through playful, contextualized and participatory activity, aiming to improve the learning process on the part of students. In the case of this activity developed at school, there was good adherence by most students to present the play. Even the shyest students, who did not want to participate directly in the dialogues, collaborated with the ideas and participated as extras in the play or even

presented other practices of colorimetric reactions, for developing the fingerprint. With this work, it was possible to verify the effectiveness of the active methodology “theatrical presentation” in the motivation of chemistry students, confirming that it is also possible to learn this science in a playful, practical and contextualized way.

Keywords: Student, Learning, Forensics, Theater, Chemistry.

INTRODUCTION SCIENCE TEACHING

Chemistry is a science considered difficult to understand, mainly due to the calculations involved, technical terms with “strange or unfamiliar” names, lack of licensed teachers in chemistry, among other factors. In the traditional way in which chemistry is taught in most secondary and technical schools, students consider it one of the most complex (Silva et al, 2020).

In addition, students seem to believe that the professors responsible for the discipline are capable of stimulating its learning. Thus, we can point out that, in addition to the way it is presented, the existing relationships in the classroom environments can interfere in the construction processes of chemical knowledge (SILVA et al, 2020).

Teaching science in Brazil goes far beyond a blackboard full of texts, concepts and drawings. It is necessary to contextualize situations, use didactic resources, be creative when explaining the content and often simulate actions so that the student’s understanding is clearer and more objective (NASCIMENTO, 2015).

Chemistry fits as an exact science into the school setting, as well as mathematics and physics. To understand it, it is necessary to have a base that comes from fundamental teaching about substances, physical states of matter, chemical element, atom, etc., and it is

necessary to have a notion of calculations – simple and elaborate – for the development of this discipline (TORRES, 2011).

The great difficulty of most teachers is precisely this: how to bring science closer to the student? How to make learning become something natural, simple and pleasurable within a context that is often seen as difficult and (almost) impossible to understand? Aiming at these difficulties, education and teaching methodologies have been shaping and modifying throughout history and active learning methodologies are increasingly present in teachers' lesson plans and in students' daily lives (NASCIMENTO, 2015; FIGUEIREDO; et al., 2017).

The type of methodology used in the teaching-learning process is considered fundamental in the training of students and teachers. In this context, it is noteworthy that the active methodology with the effective/practical participation of students is much more effective in consolidating concepts, including in the chemistry area (RICHARTZ, 2015).

ACTIVE LEARNING METHODOLOGIES

Active learning methodologies are a set of pedagogical techniques that are based more on the development of skills than on the transmission of information, leaving the student to be the protagonist of the learning process (SEGURA; KALHIL, 2015).

This term was created in 1991 by professors Charles Bonwell and James Eison in the book "Active Learning: Creating Excitement the Classroom". The idea is that knowledge can, in fact, be established in the minds of students in a practical way, working with different concepts repeatedly and with immediate feedback (DELIBERALI; ANTONIO, 2018).

Providing students with a learning environment in which there is opportunity

for everyone to think and interact with the study material is of paramount importance to promote an education that transforms, which brings students more autonomy, engagement, involvement and even a competitive spirit. so that they think of innovative options for the development of the topic in question (SEGURA; KALHIL, 2015; DELIBERALI; ANTONIO, 2018).

Unlike traditional teaching methods, still widely used in universities and technical schools, innovative and active strategies have helped students learn and develop their skills to perform their future profession with more confidence and security, thereby reducing anxiety, stimulating creativity, sharpening perception and allowing those involved to understand group dynamics, personal freedom and improving communication skills.

Once these strategies are properly applied, their use offers advantages to learners, such as: increasing interest in activities developed in the classroom; encourage involvement in the teaching-learning process, as they make them protagonists and not passive recipients of knowledge (DELIBERALI; ANTONIO, 2018).

There are several ways to apply active learning methodologies, such as using games, flipped classes, station rotation, seminar presentations, songs, dances and theater.

DRAMATIZATION AND ROLE PLAYING

Dramatization used as a learning strategy consists of allowing students to act out a situation and/or to be part of the content to be addressed, observing evidence of knowledge.

Human beings communicate at all times, either orally or through movements and gestures. Human expression is associated not only with spoken language, but also with bodily, facial, etc. (DELIBERALI; ANTONIO,

2018; ANDRADE et al., 2019)).

Role playing is a teaching-learning methodology that uses simulation as a teaching method. This methodology allows the student to assume the role of another through the simulation of daily activities with the purpose of sensitizing others. According to Rabelo (2015), in this perspective, this methodology can be conceptualized “as a technique in which students are invited to act in a given context, playing specific roles” (ANDRADE et al., 2019).

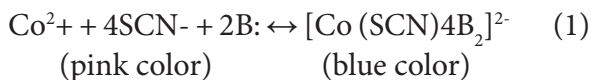
In this article, dramatization was used to represent the action of the police in the fight against drug trafficking, inspired by the series “Aeroporto São Paulo” presented by the National Geographic channel.

GOAL

The present work aimed to motivate students of the technical course in chemistry, through the use of an active methodology, to demonstrate that it is possible to learn chemistry in a different way from traditional (expositive) classes. To this end, students in the second module of the course had to prepare and rehearse a play simulating the cocaine detection test, similar to the one on the series *Aeroporto São Paulo*, and present it during the reception week for new students on the course.

MATERIALS AND METHODS

A few weeks before the end of the first semester, students at Etec Dona Sebastiana de Barros, in the city of São Manuel-SP, watched some episodes of the series “Aeroporto São Paulo”, in which the suspects were approached by Federal Police agents and after an interrogation and a search of their luggage, the experts detected a white-colored substance, which in the Scott test (UNODC, 1994) showed a positive reaction to the blue color of cocaine alkaloid (see reaction 1).



In another stage, the script of some scenes was elaborated and the rehearsals of the dramatization began. A mixture containing 100 g of starch and 0.5 g of potassium ferrocyanide was prepared in order to obtain a white colored powder to simulate cocaine. This mixture was very well homogenized by grinding in a mortar and pestle. It was then placed in plastic bags to be “camouflaged” in objects such as the white sole of a tennis shoe, the false bottom of a black backpack, covered with an insulating tape, wrapped in a pillow to simulate a baby’s belly. pregnant woman, among others. All students in the 2nd module class participated in the staging in some way, whether as narrator, suspect, Federal Police agent, expert or even as an extra. The “revealing” of the test was performed by adding drops of ferrous sulfate solution at 1% (m/v) added to methyl red indicator at 0.2% (m/v), to simulate the reagent thiocyanate of cobalt II from the Scott test to the suspected dust seized. In cases where it turned blue, representing “positive for cocaine”, the expert would direct the suspect to a room representing a provisional police station where another dialogue would begin, seeking to ascertain the reason for that international drug trafficking. And similarly to the episodes watched, the suspect always claimed ignorance of that product, claimed that he had been deceived, or that he was going through many financial difficulties. So that it would not be configured as an “apology for drugs”, the narrator used the expression “this individual will be available to justice and will be tried for the crime of international drug trafficking. If he is convicted he could face 8 to 15 years in prison”! Then, the new students of the course were informed about the chemical reactions involved in this scenario, the importance of studying chemistry and

its various applications and to complete the reception event for the new students, some more colorimetric reactions were presented that simulate the activities of the chemical experts.

RESULTS AND DISCUSSION

In current teaching practice, the use of an active methodology is advocated through playful, contextualized and participatory activity, aiming to improve the learning process on the part of students. In the case of this activity developed at the school, there was good adherence by most students, aiming at the reception of students entering the course, with the presentation of the theater play.

Even the shyest students, who did not want to participate directly in the dialogues, collaborated with the ideas and participated as extras in the theatrical play or even, presented other practices of colorimetric reactions, such as revealing the fingerprint on the paper, through heating of iodine crystals in a beaker covered by a watch glass (BRUNI, et.al, 2012; MODESTO, C.J.S. 2017).

As for the simulation of the Scott test on “fake cocaine”, the appearance of a blue color was observed, similar to what happens in the real test with cobalt II thiocyanate (UNODC, 1994; BRUNI et al., 2012). This is because the colorimetric reaction proposed in this work was based on the qualitative reaction for the detection of ferrocyanide ions (present in the “suspicious powder” apprehended) with ferric ions, obtained by oxidation of ferrous sulfate present in the reagent designed to imitate Scott’s reagent. In this reaction, a coordination compound called iron ferrocyanide, with the formula $\text{Fe}_4 [\text{Fe} (\text{CN})_6]_3$, also known as “Prussian blue” or “Berlin Blue” (VOGEL, 1981), was formed.

The chemical equation representing this reaction is:



]₃(s).

Prussian blue is the name given to the solid pigment used to make paints, to print or to blue white clothes.

At the end of the presentations, a brief questionnaire was applied and it was observed that all students were surprised by the possibilities of practical classes in this course, different from what they had already experienced in other schools.

CONCLUSION

With this work, it was possible to verify the effectiveness of the active methodologies of applied learning: dramatization and role playing, both in the motivation of chemistry students, and in the way they acquired knowledge, according to the answers to the questionnaire, thus confirming that also it is possible to learn this science in a playful, practical and contextualized way.

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