Alternative ways in chemistry teaching: Providing the creativity of high school students

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ABSTRACT

Education is undergoing many changes in the course of time, among these changes are the new educational trends known as alternative forms of teaching, and it works in an interdisciplinary way; making a connection with what is taught in the classroom and the daily life of the student. When working with alternative forms, chemistry teaching in the classroom is no longer a sacrifice but a complement to education because when related in context with your daily life there is an understanding of the importance of chemistry in addition to the classroom, both teaching and learning taking new trends to be worked into the school. This work aims to show how the two forms of teaching works together, the traditionalist way and the alternative form of education through themes linked to water chemistry concepts using comics and theater. It was observed that students understand chemistry concepts through their own creations in comic books, making the process of teaching and learning take a new dimension. Despite the barriers faced by both sides in the classroom, these alternative forms encouraged the production of its own history in order to instigate creativity, responsibility of the student, working with the other school disciplines and encouraging the student to always read.

Key words: Alternative forms of education, theater, applied chemistry, chemistry teaching.

INTRODUCTION

Education in general, has been going through change, to provide new ways of teaching for teachers and, consequently, the students will be taught in a more dynamic way, using as a basis the traditional way of teaching from an alternative perspective. The way chemistry classes have been addressed in the schools over the years show that there is a great need for more context classes; students find it boring and unattractive to capture your attention in the classroom (Silva et al., 2016). With the lack of interest from students, teachers end up getting too discouraged with the classroom. Vygotsky (1998) shows in his research that human being passes through two processes of formation of concepts. The first process occurs in the infant stage, when the children, in their everyday experiences, develop skills outside of school, in family life and from other people. The second presented case concerns the formation of scientific concepts, which takes place at school, being systematized by scientific nature experiences, with a higher degree of complexity (Silva et al, 2006).

When working with alternative forms of chemistry teaching, the classroom is no longer a sacrifice but a complement to education because when related in context with your daily life there is an understanding of the importance of chemistry in addition to the classroom, both teaching and learning taking a new trend to be worked into the school. It is important to develop the student's ability in the sense that it can participate and make critical decisions about the topics proposed in their daily lives. There is also a need to look at the language of chemistry because the high school student appropriate new vocabulary with new meanings. Given the complexity that presents itself, the chemistry of language should be seen in a simplified way, and the main goal is not about memorization, but understanding the importance of chemical knowledge and its general principles (Silva et al, 2013).

When working with audio visual resources, educators have to be very careful with what will be presented to students as they cannot evade the issue presented in the
classroom. According to Conde et al. (2013), the teacher is the mediator of knowledge, which helps, supports and encourages students to build their concepts, leaving the knowledge holder with the ability to obtain and understand the phenomena of nature and the changes produced by man through teaching, where each individual will play their role responsibly, conscious and critical (Lima et al., 2011). This process is used to assist student learning in context, promoting the debate within the classroom and as a result understand the alternative form of content. The comic has been an alternative way of teaching, very productive, because it instigate their creativity to textual production with chemical issues, demonstrating that students have a process of interdisciplinary learning, as for the creation of comic books he needs cover other areas of knowledge. This paper aims to demonstrate new forms of chemistry teaching, in an interdisciplinary way, promoting the debate within the classroom, making use of audiovisual materials and stimulating the creativity of students in the textual production of comic books.

According to the Rosa (2012), the chemistry teaching in education must collaborate in order to underpin the construction of scientific knowledge of the student, placing it as the subject of this process and not as a mere spectator. In other words, context is to give meaning to the contents and make them able to be questioned. Work content in context facilitates the learning process. The simple task of boiling water to prepare can food should be related to the chemical content seen in class. The chemistry of the study should be focused on understanding the issues and not on memorization of formulas, rules and classifications.

This paper aims to show how the two forms of teaching works together, the traditionalist way and the alternative form of education through themes linked to water chemistry concepts using comics and theater.

MATERIALS AND METHODS

The Brazilian Scholarship Program for Initiation to Teaching (PIBID) is partnering with the State Preparatory High School Orlando Venancio dos Santos, located in Cuité, state of Paraíba, Brazil high school students. The proposal was to work in classrooms; making use of alternative forms of teaching, correlating the chemical content with daily life lived by the school student. In this regard, we find ourselves in an arena of struggle, as do education requires, above all, a struggle that takes place in our everyday life, that is, replicates and unfolds (Silva et al., 2013). These developments are dealing with the materiality of our methodological choice, allowing students understand the relationship between the proposed content and social content of chemistry teaching.

Videos were shown working the theme, generating debate inside the classroom, where student mentioned their opinion regarding the content, worked up their creativity by producing posters to serve as a warning about the problems exposed by the teacher.

The theme that was crafted by the students was the shortage of water, a problem that is being faced in our region, relating to chemistry concepts learned in the classroom as it relates to chemical bonds, polarity, solutions, and also knowing a little bit of chemical history through alchemy. The teacher cannot be imprisoned only in the traditional teaching, being necessary to use alternative teaching methods with funds in which it has access (Conde et al., 2013). The student's creativity is needed when working with text production in stories comic format as well as in the production of plays and videos, all of which is an alternative form of education, working in an interdisciplinary way with Portuguese, English and Spanish. Pinheiro et al. (2013) reports that listening to students enables the teacher to become a partner, it generates confidence and also enables the relationship between educator and student walk towards overcoming the contradiction of views that exist between them (Gasparin, 2007).

The work was developed at different times to encourage the creativity of the student to create their own story based on the content of chemistry, working the theme water; encouraging students to read to develop good stories. After the productions of the comics were presented for their classes, the use of videos on the issue of water shortage was also obtainable. This generated a productive debate in groups, each exposing your opinion and defending, producing posters that were on display at school serve to alert the lack of this precious asset, which is water and drugs. With the commitment of the students, teachers were able to mount a play, working the history of chemistry through alchemy, allowing the student to know a little more of the important of chemical in our history. The presentation of the theater was in school science fair.

RESULTS AND DISCUSSION

As is well known, teaching chemistry has been a constant challenge for the teacher because of the great difficulty of leaving a bit of the traditionalist form of education. Presentation of scientific knowledge to the learner is required, therefore seeking new ways to present this knowledge, give rise to the most productive class. According to Cunha et al. (2011), the use of alternative teaching resources enabled the teacher convey the information more easily, and has provided students the understanding of the contents explained in class. With this new teaching methodology, it was found that students showed more interest and curiosity for the subject of chemistry, it became the most participatory in class, and have improved in attendance.

The PIBID has been working in partnership with the teacher in the classroom, looking for alternative forms of education such as the creation of comic books (Figure 1), how to work on the theme "precious water, essential to our survival," making relationship with chemistry concepts previously presented to the student and then discussed in class to form their opinion regarding what
would be produced by them.

The creations began with the production and presentation of posters on the theme of water. The production of comics, making relationship between everyday with chemistry concepts, working polarity, solutions and chemical bonds began based on the production of posters. After several discussions in the classroom, they began production of their own stories, awakening thus the student's interest for reading and exposing the comic as an alternative form of education. It can be said that, upon acceptance of comics in the textbooks, the idea of noxiousness harmfulness of them was drastically reduced. Although this language will often be used in books the wrong way, however their entrance into stories in textbooks meant that they started to be seen (even by the most traditional) as possible educational material, since they were now present in the teaching materials suitable for the classroom (Pizarro, 2009).

The students were excited about creating their own comic strips since working in an interdisciplinary way ensured links with other subjects worked in school, after all this process, their work would be shown to the class. Rosa (2012) reported that teaching practice and contextualized curriculum must be guided in cognitive differences and cultural partner. This means that the chemistry teaching should be based on other content from the initial series, respecting the form of specific approach for each teaching series. This integration between disciplines could occur through the use of cross-cutting themes that would allow the inclusion of basic chemical concepts for better construction of scientific knowledge in the finals series. The student interest was evident during development from project; the assessment was made of continuous and informal way, the observation was the evaluative form that was used to assess how much the student has evolved during the course since project (Figures 2 and 3).

For the school science fair, the working concept of chemistry in the form of theater (Figure 4) was presented. A little about the history of chemistry, through Mary Jewish and Basil, showing the process of chemistry through the alchemists was very gratifying seeing the commitment of students in this process. They took seriously what was going to be presented, rehearsed a lot, worried with the costumes and the material to assemble the lab, worked jointly with the initiation scholarship team to teaching, thus forming a strong academic link (Sousa et al., 2015).

The visual aid when presented to students, always ends up leaving the most productive class, both for teaching and for the students, providing moments of interaction between the class and the teacher in a debate that ultimately ends up yielding good posters to express understanding of what has been taught to them; alternative forms of education are connected with traditionalism, to provide more dynamic classes, forming a partnership between the class and its teacher in the teaching and learning (Figure 5).

According to Rosa (2012), the development of human beings is based on the collaboration that exists between this and a mediator, which can be an educator. The agent’s action causes the student to develop their skills which in itself would not be developed. This function is called the zone of proximal development or potential which are the actions taken by mediating activities.

Conclusions

The work points out the positive points that alternative form of education has provided to students, such as
Figure 2. Comic building on the concept of drugs.

Figure 3. Comic building on the concept of drugs.
stimulating their creativity, helping to work together, learning to be more responsible, both in their academic and social life. As educators, we believe that in learning, it is necessary to reflect the action of teaching and implying change in pedagogical practice: conceptual and attitudinal change on the part of the educator. In this sense, Chemistry teaching calls for new meanings, new contexts, new understanding of the world and be in the process of formation of scientific concepts. The theme worked with students was water, as this resource was scarce in this region, working this issue in chemistry made the students understand the chemical content such as polarity, connections and solutions, which are content that can fully explored the established theme.

The progress of students during their own creation generated good results, assisting in the process of teaching and learning. Students end up getting more interested in the classroom, learning content in a fun way, but without shirk responsibility to learn the chemistry content. When working in an interdisciplinary way with the student, it can be seen that the student had a satisfactory return to alternative forms of teaching.

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