International Journal Semiarid

# ELECTROCHEMISTRY: A NEW AWARENESS ABOUT ENERGY

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## ABSTRACT
The experience of student awareness developed in the discipline of chemistry is reported as of the sixth Science, Sport and Culture Fair of E.E.E.P Ícaro de Sousa Moreira, located in the city of Fortaleza-CE. The objective was to produce attitude changes to minimize the waste of electric energy, being these attitudes extended to the households. In addition, the work allowed the development of a more autonomous socio-educational posture, broadening the basic knowledge of electrochemistry and contributing to sustainable environmental actions through recycling.
**Keywords**: Electrochemistry; Reuse and Energy; Awareness.



# ELETROQUÍMICA: UMA NOVA CONSCIENTIZAÇÃO SOBRE ENERGIA.

## RESUMO
Relata-se a experiência de conscientização discente desenvolvida na disciplina de química a partir da realização da VI Feira de Ciências, Esporte e Cultura da E.E.E.P Ícaro de Sousa Moreira, situada na cidade de Fortaleza- CE. Objetivou-se produzir mudanças de atitude para minimizar o desperdício de energia elétrica, sendo estas atitudes estendidas aos domicílios. Além disto, o trabalho possibilitou desenvolver uma postura sócio educativa mais autônoma, ampliar os conhecimentos básicos de eletroquímica e contribuiu para ações ambientais sustentáveis através da reciclagem.
**Palavras-chave:** Eletroquímica; Reaproveitamento e Energia; Conscientização.

## INTRODUCTION

Electricity, problem or solution? We live this dilemma in contemporary times, a problem that extends to our homes. The energy of our homes is undoubtedly useful in various activities of our daily lives. However, its excessive use associated with the lack of sustainable awareness of the resource on the part of people, generates imbalance, waste and disorder.

It is precisely for this reason that this has been a problem discussed worldwide. Despite the television advertisements, the flags of different colors placed on our electricity bill, it is notorious the great lack of understanding and the indifference of people, who seem not to be aware that this resource can end.

This behavior could be observed closely, routinely, within the school by the students from the development of this research, which motivated us to insist on this object of study. The big challenge would be to make them understand the positive impacts of the rational use of energy: saving just 10% of daily consumption, I have already had a significant impact on the country. Another challenge would be the adoption of a differentiated posture, with a critical and autonomous conscience, so that this saving action is carried out not only in our homes, but that it is replicated wherever we are.



## MAIN GOAL

Student awareness about excessive consumption of electricity at school and alternative and sustainable ways to avoid waste.

### Specific objectives

- Teach experiments to generate energy cheaply;
- Make students replicate alternative and sustainable ideas at school and at home;
- Improve basic knowledge of electrochemistry, applying them in the socio-educational scope;
- Show the importance of recycling, through the reuse of metals

## METHODOLOGY

This is an experience report about student awareness developed in the discipline of chemistry from the VI Fair of Science, Sport and Culture (FECEC) at E.E.E.P Ícaro de Sousa Moreira, located on the outskirts of the city of Fortaleza-Ceará.

The study was an exploratory-descriptive field research, with a quali-quantitative approach. A semi-structured questionnaire containing 10 questions was applied randomly to 50 students who agreed to participate in the research as an instrument for data collection. The questions allowed us to draw a behavioral and conceptual profile about energy expenditure, with a lack of concern for the subject and little knowledge about sustainable resources being verified. Data analysis was based on participant observation

during lectures and awareness workshops on the theme offered to a sample of 30 students, randomly selected from among the 50. The activity was developed from April to June 2018, guided by the professor of chemistry Francisco José Mendes dos Santos and co-supervised by professor Marcélid Berto da Costa. Two students of the technical course in nursing developed and implemented this research (Nátali Gomes Bandeira and Yasmin dos Santos Mangeth).



Initially, we carried out a theoretical survey about the basic concepts of electrochemistry through a literature review. After surveying the theoretical references that would support our practice, we began to carry out experiments in the chemistry laboratory. Our goal was to develop an electrochemical battery, made from cheap, recycled materials, that could charge a cell phone or smartphone. After seven months of testing, we finally managed to assemble a structure that was able to charge a cell phone with the help of a voltage reducer (purchased over the internet at an affordable price). This structure was made up of empty effervescent vitamin C containers, aluminum cans (of soda, beer, etc.), copper wires and telephone cables (all reused from the garbage), pieces of cardboard and bleach.

The next step consisted of sharing the experiment with peers (students) through FECEC. In addition to demonstrating that it is possible to build alternative generators of electricity, we aim to make the target audience aware of waste and the need to avoid excesses in the use of electricity, as well as to emphasize the possibility of extending these actions to their homes. The idea is that the information provided on the subject is passed on directly or indirectly to others, in order to trigger attitudinal changes that favor sustainable and renewable practices in energy consumption. Thinking of enhancing the process, we teach them how to build an alternative source of energy and challenge them to carry out the experiment in their own homes or at school. An energy island is even being tested in the chemistry lab that could even help turn on a light.

## RESULTS

After an awareness-raising activity, we applied a self-assessment questionnaire to the participants (sampling) three months after the lectures and workshops were held. The

instrument was composed of 08 questions and aimed to track attitudinal changes about students' behavior to save energy within the school.

The analysis of the responses allowed us to draw the following profile:

- 70% of students say they turn off the lights when leaving the classroom;
- 80% reported turning off the fans when leaving the classroom;
- 100% reported keeping the room door closed when using air conditioning;
- 20% recharge their cell phones at school;
- 60% say they are concerned about the school's energy savings;
- 80% consider themselves people who save energy;



The change in behavior could be observed in everyday life. After an awareness-raising intervention, the researchers observed the statements described above being objectified in concrete acts daily at school.

This allows us to affirm that the objectives of developing a more autonomous socio-educational posture in the students were achieved.

## SOCIAL RELEVANCE OF THE PROPOSAL

The project in question has the idea of socio-education, enabling the autonomy of students. In search of an education focused on everyday reality, we seek to equip and train students to problematize social issues, being able to reflect and operationalize solutions through alternative practices.

Students are presented with an action to understand and raise awareness about the use of electrical energy, based on electrochemistry, environmental preservation and recycling. With scientific knowledge and the use of inexpensive tools, students will be able to produce something easily and economically viable. This brings positive social impacts, as it reduces financial expenses and ensures that the population does not deprive itself of enjoying basic material resources for survival.

The impact of the project is noticeable by the growing search of the students to know the proposal in detail, still in its initial and improvement stages. The study of alternative energy sources and obtained in a recyclable way awakens new ideas and enhances the expansion of knowledge in the field of technologies, such as robotics.

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## IMPACT ON THE DISSEMINATION OF KNOWLEDGE AT SCHOOL

Initially, it was noticed the great lack of information among the students about electric energy. Few of them had an idea of how to produce energy in an alternative way and the importance of saving this resource. The research was motivated by the simple observation made in the school corridors. Students came out of an air-conditioned room and left both the door open and the lights on.



After the lectures and workshops, we found that the behavior of the students changed, which was confirmed after application of the instrument and through observation, as described above. The impact will be seen, in the long term, through the reduction in energy consumption and savings by the school. Although it is the state that bears the bills, we understand that they are paid with public money, which represents not only the waste of technological resources, but of public resources that, if preserved, can be applied in other necessary areas.

## FINAL CONSIDERATIONS

Although we have obtained positive results, we understand that the awareness process needs to continue. We intend that the generated changes remain in our students, and that they do not only practice such actions at school, but that they extend the idea of saving energy to their families.

We observed that, in addition to raising a critical awareness for attitudinal change in economics, the subject aroused in students an interest in knowing more about renewable energies, which was noticed in the classroom even by teachers of related disciplines, who stated that students were asking and asking questions constantly after the lectures and workshops.

We intend, therefore, to continue and improve this project, so that we can obtain energy through cheap resources and that this knowledge is shared in other schools, in science fairs, seeking to increase the global awareness of a general public, making this theme has relevance and is embraced by new researchers.

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