

**Subject Area: EDU**

## **Chemistry teaching as a catalyst for innovative and inclusive ecosystems for students with Autistic Spectrum Disorder.**

**Érica F. P. Severnini\*** (FM) (PG),<sup>1,2</sup> **Fernando S. Severnini (FM)**,<sup>1</sup>.

**[ericafporuczinski@outlook.com](mailto:ericafporuczinski@outlook.com)**

<sup>1</sup>Paraná State Department of Education – SEED/PR; <sup>2</sup>Western Paraná State University – Unioeste, Toledo Campus;  
*Keywords: Chemistry Teaching, Inclusion, Autism, Experimental Practices, Educational Innovation, High School.*

### **Highlights**

Adaptive activities fosters inclusion and learning for ASD students.  
Contextualized Chemistry teaching transforms school into an innovative scientific and socially inclusive environment.

### **Abstract**

Chemistry teaching, when attached to experimental practices and the inclusive perspective, may constitute a powerful ecosystem of educational innovation. This work puts forward a proposal of experimental approach tailored for students with Autism Spectrum Disorder (ASD), with the purpose of promoting significative learning, inclusion and the ownership of scientific knowledge. Several authors remark that the main constraints related to Chemistry teaching lie on the difficulty of translating the scientific language into a more comprehensible and meaningful one for autistic students. Since complex knowledge is required, such as mathematical notions and interpretation of natural phenomena, teaching demands adapted methodologies both in the classroom environment and in practical activities aimed at this effective pursuit. Such activities were developed with 11th-grade High School students in a public rural school in the State of Paraná, which included a student on the Autistic Spectrum. For this didactic structure, the theme of battery cells was chosen (due to being a complex one) and a planning encompassing exercises to be developed was elaborated, having in mind the students' previous knowledge and anticipating the outcome of the experimental activities. Firstly, a three-dimensional periodic table was assembled so that students could recognize the chemical components, such as zinc, carbon, manganese, etc., which are enclosed inside battery cells. After that, simplistic, safe and contextualized experiments, involving daily chemical phenomena, namely electrical conductivity, were prioritized. During said moment, the class was divided into groups to test the electrical conductivity using homemade dough made from wheat, salt and water, along with wires and a 9V battery. After preparing the dough, students were expected to test the conductivity in series and parallel circuits, apart from observing whether the LED light would be turned on. The experimental script was adaptively developed, incorporating visual resources, illustrated sequences and oral support, promoting both conceptual comprehension and social interaction. In sequence, students produced leaflets informing on the correct disposal of battery cells and made them available to other classes in school. Furthermore, to complete the didactic structure, the autistic student developed an online game using the Quizizz platform, which was played with all classmates. This qualitative analysis of said practices has highlighted improvements in the attention span, communicative skills and scientific learning of the ASD student, while also strengthening the collaborative and creative teaching practices. It can therefore be concluded that Chemistry, by being taught in a contextualized and accessible manner, serves as an enhancer of innovative educational ecosystems, fostering school as a scientific, inclusive and socially transformative environment.

### **Acknowledgments**

We wish to express our gratitude to the Paraná State Department of Education (SEED/PR) and to Western Paraná State University (UNIOESTE) for their support in fostering academic research and promoting inclusive Chemistry teaching practices.