

The Use of the Cuisenaire Rule in the Classroom

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Abstract: This pedagogical proposal was implemented in the curricular space of mathematics, in the first year of the basic cycle of the pluricurso in IPEM 116 "Manuel Belgrano" Rural Annex Punta del Agua, with Orientation Agro Ambiente, Department Third Arriba, province of Córdoba, República Argentina. It was developed according to the difficulties shown by students in not being able to establish the relationship that exists between natural, fractional, decimal and percentage numbers. Faced with this situation, it is proposed to develop the Cuisenaire Rule as a teaching resource in order to stimulate and develop the logical capacities in students within the framework of thoughtful and operational mathematical thinking by applying it in the resolution of specific learning situations. The construction and application of this resource allowed them to develop the understanding and assimilation of concepts in which they presented difficulties promoted learning and taking of.

Key words: didactic resource, fractions, decimals, percentage.

1. Introduction

The use of teaching material plays a fundamental role in learning Mathematics. Its correct use constitutes the understanding of concepts, relationships and mathematical methods that allows active learning according to the intellectual evolution of the student. Cuisenaire strips are a versatile math handling game used in school, as well as in other levels of learning (such as in languages). They are used to teach a wide variety of mathematical topics, such as the four basic operations, fractions, area, volume, square roots, simple equation resolution, equation systems, and even quadratic equations [1].

One of the main objectives of the teacher is to help students develop the ability to calculate, the use of teaching materials with a logical-manipulative approach as the Cuisenaire rule are a resource to be taken into account [2]. The strips allow initiation in the calculation by decomposing the numbers with the help of a tangible and manipulative support,

easier to understand by the students in their early stages of learning because it allows them to develop the mental calculation and its corresponding representation. In addition, it allows students to experiment on their own, encouraging the development of the autonomy of the same while seeking answers independently and spontaneously [3].

The experience was carried out with students in the first year of the basic cycle (pluricurso modality) using the Aula Taller format. This modality enabled the development of skills related to teamwork and creative thinking, generating a learning dynamic of the type "learning by doing" in the face of a "problem situation". Learning design techniques was promoted where students made decisions by planning, organizing, managing and executing the project.

2. Purpose, Design and Implementation of the Proposal

The identified difficulties that motivated the development of this project is detected when students of the basic cycle show obstacle in demonstrating and understanding the relationship that exists between integers, fractional numbers, decimal numbers and percentage. It is in the facts

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about the prior knowledge to students on the concepts of fractions, decimal numbers and percentage. They demonstrate knowledge that each of them means but fail to demonstrate and understand the relationship that exists with each other. Faced with this situation, they are proposed to develop the **Cuisenaire Rule** as a teaching resource allowing it to develop the understanding and assimilation of concepts through the active construction in a manipulative, graphic and symbolic way.

The objectives to be taken into account are:

General:

- Acquire new learning strategies that allow the student to appeal to thoughtful thinking.

Specific:

- Implement and develop understanding of concepts through the construction of mathematical strategies.
- Improve student learning.

Taking into account **pedagogical priorities**:

*improvement in language, math and science learning,
 *more confidence in students' learning possibilities,
 *Increased time in school and classroom in learning situations,
 *Good institutional climate that favors teaching and learning processes and **fundamental abilities**: *Orality, reading and writing, *Addressing and resolving problematic situations, *Critical and creative thinking and collaborative work to learn how to relate and interact, it is established to develop the pedagogical proposal under the format of Aula Taller.

It is decided to work collaboratively together with the area of Technological Education providing its contributions related to its specificity such as recognizing the materials, instruments, elements to graph, elaborate diagrams and schematics.

After coordinating with the area of Technological Education the following activities are carried out.

3. Part one: Elaboration of the Didactic Material

Information is searched and researched on the **Cuisenaire Rule** considering: What is it? What is it used for? How is it used? What are the models and which are the most practical to use?

- The information obtained is discussed.
- There are fundamental aspects that characterize the **The Cuisenaire Rule**.
- The type of strip to be constructed is set. The Strip where the unit expresses, its fractional number, decimal, percentage and reading mode equivalent is selected.
- Then we debate how it will be built, what materials would be used, the dimensions of it, which physical space would use to work among other aspects.
- Tasks are distributed: search for materials, (cardboards, self-adhesive paper, rules, squares, calculator, scissors, glue).
- Groups of three students are assembled each with their respective activities: Design, Cutting, Folding and Armed.

4. Part Two: Didactic Material Application

- A class is prepared where they themselves show how they have worked, what techniques they have used, in addition to the resources to the students of the second cycle.
- They experienced and discovered the relationships between integers, fractional numbers, decimals, percentage and what their reading is.
- They discovered equivalence and inclusion relationships.
- The concept of “greater than”, “less than”, “equal to” or “equivalent to” was worked on.
- They exchange concepts and examples with their peers using different problematic situations.

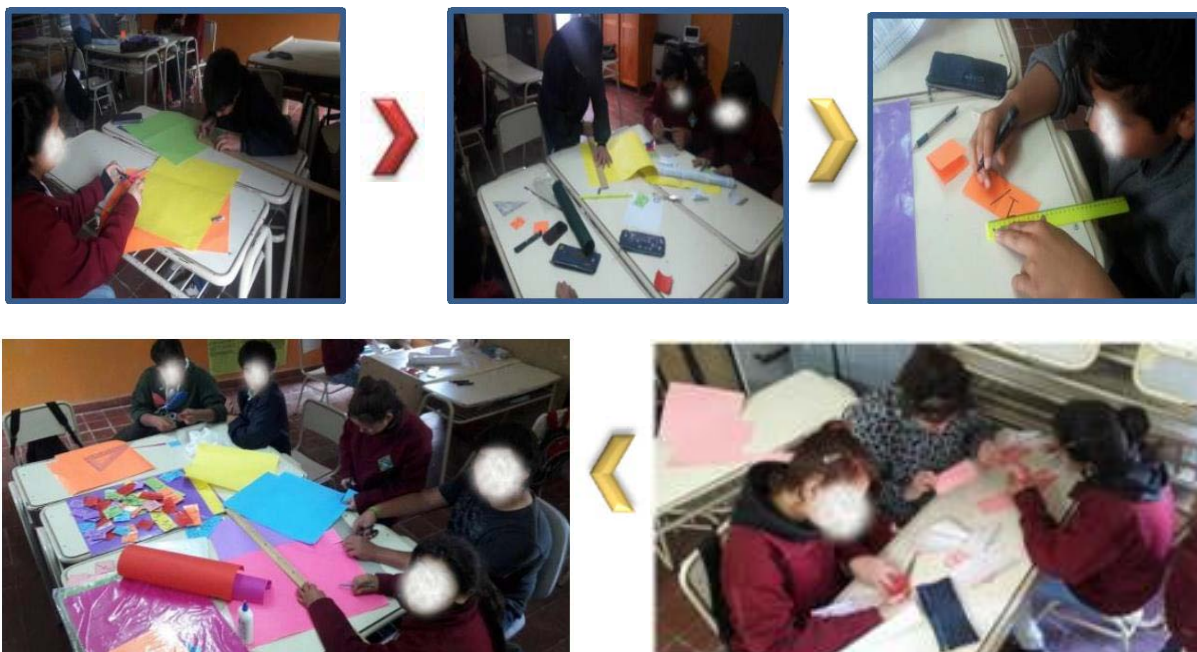


Fig. 1 Different stages of construction of the strip.

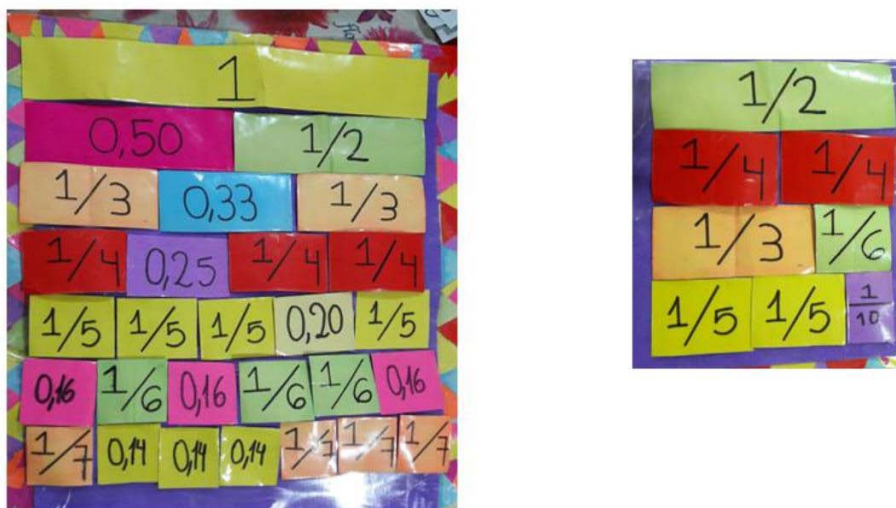


Fig. 2 Strip showing fractional numbers and decimal numbers

5. Results Obtained

- Learning strategies: ABP.
- Curriculum Format: Aula Taller.
- Spaces: classroom.
- Resources: - materials: cardboard, rules, pencils, self-adhesive paper, scissors, fibrons among others.- humans: teacher, tutor teacher.

- Grouping shapes: groups of 3 students assigned for design, cutting, folding and assembly.
- Period: August-September 2018

The methodology of the development of the Aula Taller format allowed to carry out collaborative work between the different students of the multicurso respecting their gradualities as their capacities that characterizes each of them and be able to achieve a

practical and functional approach in the development of activities.

The learnings that promoted the experience had the following impact in the school field:

- Greater development of creative and operational thought processes.
- Use of various strategies at the time of design, cutting, assembly and folding consensual among students.
- They showed great enthusiasm for the dynamics of the proposal.
- They solved different problematic situations proposed using the Strip as a teaching resource, thus achieving a meaningful learning.
- Collaborative work among students.
- Peer interaction learnings.
- Greater autonomy, organization and coordination in working groups.

6. Final Considerations

The institutional times in which this proposal was developed are those that correspond to the hours allocated for both curricular spaces so it becomes an practice of 6 weeks of work from the beginning to the end of it (August-September, 2018).

The teaching interventions had to do with the medium-ranging guidance and advice that the aulic work was happening. The setbacks presented were resolved by the students with the help of the teacher

during the course of the activities. The project was developed at the stipulated times.

The evaluation was carried out at different times of the student's work on a set of actions or products. The work process of the different students was evaluated by establishing it when starting the project. Such work has great potential in stimulating students problem-based learning processes with practical and functional approaches.

The proposal for the use of this teaching resource improved performance by showing significantly favorable results in resolving problematic situations without major obstacles.

References

- [1] José Angel Murcia Carrión (January 27, 2014). "Cuisenaire Strips, The First Time." <http://www.tocamates.com/>. Retrieved October 20, 2019.
- [2] Martín-Adrián, A. (1999). "The Cuisenaire Strips: Activities on Length, Area, Perimeter and Volume." *Journal of Mathematics Didactics* 37: 19-28.
- [3] Canarian Society of Math Teachers (2014). "Project Newton. Mathematics for Life: A Way to Meaningful Learning Mathematics." REDINED. Retrieved October 20, 2019.
- [4] https://es.wikipedia.org/wiki/Regletas_de_Cuisenaire, Last entry 24/05/2019.
- [5] <https://sites.google.com/site/materialdidacticoparampcl/home/regleta-cuisenaire>, Last entry 05/05/2019.
- [6] <https://seeducansolos.wordpress.com/2011/05/22/single-ames-con-strips>, Last entry 05/05/2019.
- [7] <https://en.scribd.com/doc/46750104/Fractions-using-strips>, Last entry 05/05/2019.