

AN ACT OF MATHEMATIZATION FOR THE FAMILIARIZATION WITH FRACTIONAL NUMBERS

Sabrina Alessandro, Petronilla Bonisconi, Marina Cazzola,
Paolo Longoni, Gianstefano Riva, Ernesto Rottoli

Gruppo di Ricerca sull'insegnamento della matematica per la scuola primaria –
Università Milano Bicocca

Short description of the Discussion Group: aims and underlying ideas

In spite of the efforts over half a century both in research and in practice, the results of teaching fractional numbers are not satisfactory and difficulties are widespread and persistent. We have started an unusual project concerning the introduction of the fractional numbers, in the third degree of primary school. The key points of our proposal are: (1) a process of familiarization with fractional numbers; (2) fractional numbers as a new universe; (3) the foundation is an act of elementary and fundamental mathematisation which identifies the action of comparing homogeneous quantities with a pair of natural numbers; it differs both from an excessively formalized approach and from modelling; (4) the measure of a quantity is defined as the comparison between the quantity and the “whole”; the term “unit” is reserved to indicate the “common unit”; (5) “dialogy among the activities” is the act of playing the different manipulative, depending on the properties you want to present.

Planned structure:

Tuesday, 16.30-18.00: Planned timeline	Topic	Material / Working format / presenter
The first scene should last no more than one third of the first session by reason of the limited time.	Two rhetorical questions about unsatisfactory results and inhibitions in teaching and learning fractions. Q1. Are the unsatisfactory results in teaching and learning fractions also due to a not adequate attention to “other” proposals? Q2. Does the question of inhibitions deserve more attention?	Images from exercise books. Ernesto Rottoli
The second scene occupies two-thirds of the this session and should catalyze the discussion.	Two questions about the structure, the role and the efficacy of process of mathematisation that we have developed in classroom. Q3. Does the mathematisation be fundamental in the didactics of fractions? Q4. Does this mathematisation differs from modelling?	Images from exercise books. Ernesto Rottoli

Friday, 16.30-18.00: Planned timeline	Topic	Material / Working format / presenter
The third scene occupies two-thirds of the this session and should catalyze the discussion.	<p>Two questions about the Euclidean division as result of the mathematisation process and core of teaching process.</p> <p>Q5. Could the Euclidean division be perceived by children not as a formula to be memorized, but as the icon of their active process of learning?</p> <p>Q6. Does the Euclidean division, as core of the activities, need of a didactic process in form of feedback loops?</p>	<p>Images from exercise books. Ernesto Rottoli</p>
The forth scene occupies one third of the second session	<p>Three open questions about familiarization, “dialogy” and the need to change paradigm.</p> <p>Q7. In what respects the process of familiarization with fractions differs from the process of teaching and learning them?</p> <p>Q8. Is it possible to choose, depending on the considered property of the fractions, the manipulative that permits to build the more effective “implicit model”?</p> <p>Q9. Are the teachers called for a change of “paradigm”?</p>	<p>Images from exercise books. Ernesto Rottoli</p>