FROM EVERYDAY EXPERIENCE TO CONCEPTUALIZATION THROUGH
GRAPHIC REPRESENTATION:
A CLASS EXPERIMENT IN ITALIAN PRIMARY SCHOOLS

Silvio Rigatti Luchini and Maria Pia Perelli D’Argenzio
Padova University, Italy
rigatti@stat.unipd.it

This poster presents some works by primary school children and shows the meaning of
the graphics made by the children themselves with the data they collected.

This paper moves from the awareness that in the real modern world, communication often
takes place by representations, e.g., figures, graphic symbols and other various graphics, from the
iconic representations to the statistical histograms. Very often this communication is presented in
a biased way to convince somebody of a certain thesis more than simply presenting the data
correctly. This happens particularly often when information is presented by the mass-media using
graphic representations. In this case, what is a very useful tool to visualize information becomes a
source of false interpretation.

The situation is slightly better in the case of information about scholastic subjects
(graphics about geography, history, sciences…). However, an analysis of this kind of books
reveals, at least in Italy, many errors. The situation did not improve, actually it even became
worse, with the introduction of the personal computers. They render the construction of the
graphics so easy that it minimized the time spent thinking about the graphics themselves. The
possibility of choosing from among different graphs without any criteria causes many pupils to
create, with the computer, graphic representations that are not suitable for the data. Moreover, the
Italian version of Excel is affected by a non negligible mistake, i.e. whatever graphics with bars is
called “histogram”, except the proper histogram, a part from the continuous case with intervals of
constant width.

Our research group has been interested in multiple approaches to the problem of the
graphic representation to obtain a full understanding of the graphic messages and their errors.
After years of imposing the structures of graphics on pupils we realized that they could not
understand deeply the characteristic of data they were displaying. When they are free to do their
own presentation formats we found that they learnt much more. While doing this we realized how
the pupils are conditioned in their representations and how often presenting graphics that are
almost already done (as in the case of Excel) means only teaching them to have a didactic contact,
that is immediately removed once the pupils are away from the scholastic environment. To avoid
this it is important to study the mechanism that lead the pupil to interpret graphically the data in
certain way rather than in another one. Sometimes it has been noticed that in the classrooms the
teachers tend to start from an approach to the representation that is too mathematically-oriented:
in those situations the research was devoted mainly to percentages, proportions and the graphic
representation was only the basis to those purely arithmetic activities.

Bearing in mind the reasons discussed above, after the experience realized on a large
number of classes in the “experimentation” of year 1999/2000 our group focused the attention on
school years has been completed in five groups of primary school (fourth and fifth year) to
analyse a situation where the pupils have already encountered graphic representation in other
contexts (geography, human sciences, information…etc.). Part of the experiment has been done in
a international school, with Italian, English and French classes.