Analogy and dynamic geometry software together in approaching 3d geometry

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ABSTRACT

We present a didactic proposal on Euclidean geometry, both plane and three dimensional geometry, consisting in a guided research activity that leads the students to discover unexpected properties, of two apparently distant geometrical objects, that is, quadrilaterals and tetrahedra.

The explicit aim of the activity is to look for the analogies between figures of the plane and figures of the space, but indirectly it aims to retrieve the interest of the students to the study of three dimensional geometry that, for sure, is more complex than the two dimensional one. In fact, it presents difficulties of conceptual type as well as difficulties of linguistic type, but above all difficulties in realizing and interpreting the drawing in two dimensions of three dimensional figures.

A new and catchy approach to three dimensional geometry has been realized by means of an efficacious conceptual tool, the *analogy*, and an operative one, a *dynamic geometry software*. The use of the analogy turns out to be precious because it represents a bridge that create a significant link between two and three dimensions; while the software, *Cabri Géomètre*, permit to pass from observations on quadrilaterals realized with *Cabri II Plus* to explorations on tetrahedral realized with *Cabri 3D*.

This kind of activity represents an involving way to perform geometry aiming at: enhancing the rapresentation capacity and exploration ability of geometric sistuations; favouring autonomous creation of conjectures; boosting the consequent need of elaborating a rational argomentation of what discovered with its highest completion in the demonstration.

Keywords

Quadrilaterals, tetrahedra, dynamic geometric software, mathematical laboratory, mathematical discussion.

Observations

The proposal that we present has been developed within the Progetto Lauree Scientifiche – Scientific University Degrees Project – in the subproject for Mathematics of Catania.