

12-year olds learning mathematics with System Dynamics: a case study from a rural locality of North-eastern Portugal

Marlende de Fátima Ochoa Fernandes Cardoso

Escola Secundária de Mirandela
5370 Mirandela, Portugal
Tel. + 351 962 347 303
marlene_cardoso@net.sapo.pt

Teresa Paula Azevedo Perdicóulis

Universidade de Trás-os-Montes e Alto Douro
Apartado 1013, 5000-911 Vila Real, Portugal
Tel. + 351 919 268 630
tazevedo@utad.pt
www.utad.pt/~tazevedo

Anastássios Perdicóulis

Universidade de Trás-os-Montes e Alto Douro
Apartado 1013, 5000-911 Vila Real, Portugal
Tel. + 351 919 268 630
tasso@utad.pt
www.utad.pt/~tasso

System Dynamics is been used experimentally in the teaching of Mathematics to young adolescents, taking advantage of its capacity to facilitate the visualisation of abstract entities. The objective of the experiment is to compare the scholarly progress between the students learning with SD *versus* the others learning with conventional mathematics methodology and media.

The particular experiment is conducted in rural North-eastern Portugal, where the students historically have exhibited a low interest and aptitude for mathematics. In addition, due to socio-economic conditions, they have little or no familiarity with modern information technology and equipment, which makes an experiment of this sort especially interesting.

The experiment, running between October 2002 and June 2003, is set up with *circa* 100 students of the same year, divided in four classes: two for System Dynamics and two for classic mathematics teaching means and methods. The mathematics material is identical for all, with topics in functions/ proportionality, geometry/ similarity of figures, and algebra/ equations.

During the experiment, the students are observed by the same teacher, performing a qualitative evaluation of, *inter alia*, their participation, enthusiasm, and comprehension. The preliminary observations mark a difference between the two sets of students, the ones instructed with System Dynamics being more interested in mathematics, facing mathematics as less abstract, and “seeing more into math” than just mere equations.

Overall, the results of the experiment are encouraging and System Dynamics appears as a promising instrument for certain topics of mathematics, possibly looking into a formal curricular introduction.

Key Words and Phrases

Mathematics, System Dynamics, adolescents, rural medium, North-eastern Portugal