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ABSTRACTS**

CARLO MARCHINI & MARIA GABRIELLA RINALDI *Preconceptions of eight year old children on isosceles triangles, 5–16.*

Abstract. In an experimental study about isosceles triangles, we observed pupils' solution strategies revealing different naive approaches to the problem of measure in geometry. Our experiment discovered phenomena that should be accounted in geometrical teaching.

ERIC LAGUERRE *Archetypal figures, prototypic figures, and their effects on problem solving, 17–54.*

Abstract. A characteristic of key-figures is to reproduce theorem's premises and so to facilitate its application: for instance it's easier to see a sub-figure included in a complex configuration. In this paper, we limited our study on Thales' Theorem, and by bringing out figures named archetype or prototype – depending on their apparition before or after the teaching of the Theorem – we tried to understand how students built their typical representations. Then, we have studied how some redundant parameters defining the prototypes partly could generate difficulties on one hand on perception of figures – leading us to pathological figures – and on the other hand in the use of the theorem – leading us to pathogenic figures.

ÉRIC RODITI *Comparing decimal numbers: an experiment to help low-level attainers, 55–82.*

Abstract. Comparing decimal numbers is not just a question of how to handle the position of the digits. Yet, teaching often only proposes this kind of procedures. Our research is based upon 400 students, from 10 to 25, as well as adults. We tried to understand which other handlings comparison activity is based upon and we tried too to pinpoint factors related to learning difficulties. We tested an intervention method involving students with learning difficulties. The experiment showed that confronting right or wrong reasoning with concrete representation of decimal numbers might prove very helpful.

PHILIPPE R. RICHARD & JOSEP M. FORTUNY *Tutoring System for Improvement of Argumentative Competencies in High School Mathematics, 83–116.*

Abstract. This article tries to show how secondary school pupils can improve their argument skills with the help of tutorial systems intended for learning geometry. After having established the conceptual framework at the intersection of mathematics teaching and computer environments for human learning, the article compares the heuristic and discursive features of some tutorial systems, including the systems developed by our research team. It then deals with the issue of the complementary nature of knowledge and skills in order to aim at a strategy for assessing argument skills based on relationships in the subject-environment system. The text particularly includes cognitive control, semiotic and situational structures associated with the development of argument skills in such environments. It also tackles the specific nature of reference knowledge, the decontextualization of learning, the instrumentation of resources, the idea of mathematical proof and the role of teaching agents.

Keywords. Learning of geometry, tutorial system, model of knowledge, mathematical competences, argumentative competence evaluation.

LURDES FIGUEIRAL & INES MARIA GÓMEZ-CHACÓN *Identity and Affect in Mathematics Learning*, 117–146.

Abstract. In this paper, a high school class is observed in mathematics within a socio-cultural and an affective perspective. The goal of the research is to gain a better understanding of learning mathematics among students belonging to cultural minorities. Relevant relationships between cognitive and affective dimensions – local and global – are established and described within the qualitative micro-ethnographic approach and with help of case study. We also try to use the notions of social identity and cultural identity for interpreting how students engaged in this training emotionally react.

ABDULKADIR ERDOGAN & ALAIN MERCIER *Forums of Mathematical Questions on Internet and Expectations about Pupils' Work*, 147–164.

Abstract. Forums of mathematical questions on Internet appear today as a place where a need of help to the pupils' school works is crystallized. In this research, on the basis of the questions put by pupils on these forums, we want to study some possible sources of this need. In this purpose, we question about didactic stakes of the situations of the study and pupils' possible actions in the accomplishment of their stakes. Our analysis provides us some important results to reconsider the pupils' work and to reorganize the didactic situations.

M. EUGENIA ANDREU IBARRA & JESUS A. Riestra Velasquez *Processing Calculus as Euler and Lagrange? Experiment of Teaching Calculus at University to Tyros not Mathematicians*, 165–188.

Abstract. At the beginning of College, a Calculus course is present in many paths, for its variety of uses. But rate of failure at final assessment is a problem. An experimental core curriculum for engineering has been designed in Mexico, with the idea not to change the global content of the course, but to modify its progression. As in the historic development, algebraic derivative comes before the formal definition of local derivative as limit. End of course actually goes beyond Euler, who used the notation $f(x)$, and Lagrange, who has introduced the notation $f'(x)$, but only after a wide use of their methods. Observed results are encouraging, mainly for the students who manifested slightly deficient results at the initial assessment.

CARL WINSLOW *Transition Problems in Teaching of Analysis and Complementary Didactical Approaches*, 195–215.

Abstract. This article has for aims to precise the nature of obstacles for learning Analysis at University, and to make proposals for teaching in order to overcome these obstacles. Various approaches are considered: semiotic representations, anthropologic theory of didactics, and theory of didactical situations. Taking account of distinct phenomena, they seem us complementary and allow a plurality of uses: analyzing tasks, locally and globally organizing mathematics, structuring milieu for autonomous learning.