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ABSTRACTS**

ILIADA ELIA, *Using pictures for solving additive problems: What kind of pictures and what role?*

Abstract. The majority of the research on additive problems has revealed two kinds of obstacles: the first is related to the position of the data in the scenario described by the text stating the problem and, second, to the distinction between positive or negative transformations of the data. This paper presents a large scale research about the difficulties in solving additive problems and the role of pictures in this kind of problem solving. In particular, we examine the case of the second class of additive structure problems proposed by Vergnaud: measure-transformation-measure or change problems. We have proposed to 1447 pupils of Primary Schools (grade 1 to grade 3) in Cyprus problems in verbal expression or in verbal expression accompanied with an informational picture. The analysis of the results based on the implicative statistical analysis proves that there is an influence of the type of representation and of the structure of the problem on problem solving. We discuss the theoretical and didactical implications of the findings of this research.

CATHERINE HOUEMENT, *Problem solving as investigation activity in French primary school*

Abstract. The French curriculum 2002 for primary school (students 6 to 11) emphasised a category of problems as support of an investigation activity, aiming at the development of mathematical exploration ability. What kind of ability and/or what type of problems is concerned by this theme? In the facts (report of French Ministerial Education Authority 2006) selected problems and class lessons on this theme are very different, mathematical impact on students seems to be very weak. This text studies a priori the potentiality of such theme in the mathematics teaching and proposes criteria to choose adapted problems. These propositions may be considered as orientations for next research.

VALÉRIANE PASSARO, *Students' difficulties for acquiring covariation concept and using graphical representation in grade 8*

Abstract. Our research concerns the conversions between the registers of representation implied at the time of the passage of a functional situation to a graph. We are interested more particularly in the perception of covariation between two magnitudes by the students in grade 8. A teaching sequence has been created in order to introduce Cartesian graph to these students and to collect spontaneous representations about covariation. Our analysis principally puts in evidence the characteristics of these representations, as well as the degree of perception of the covariation by the students. It permits us to come to certain conclusions in relation to the passage to official representation: the Cartesian graph.

GEORGES TOUMA, *A semiotic study of the cognitive activity of interpretation*

Abstract. This article presents the results of a semiotic study of the cognitive activity of interpretation (Touma, 2008). The results reveal that algebraic modeling of physical phenomena requires students to reach not only the coordination stage (Duval, 1995) but also the interpretation stage (Touma, 2008). If not, the students will not have access to the conceptual contents of mathematical representations of the physical phenomena.

CHRISTIAN SILVY & ANTOINE DELCROIX, *Place of Organized Returning of Knowledge in mathematics: a new way for questioning an exercise?*

Abstract. The French ministry of education introduced in 2005 the « organized returning of knowledge » (in French: ROC) in the French baccalauréat as a tool to render more efficient the mathematical education at the end of secondary school. This article is based on an analysis of the ROC of the 2006 Antilles-Guyane baccalauréat, by the anthropological approach to didactics, which leads to the construction of its *mathematical site*. Through this analysis, some features of the ROC are discussed, such as its consistency (including from the view point of the institution) and the transparency of this evaluation.

KHEDIDJA KOUIDRI, *Problems for teaching integration at the beginning of university in Algeria*

Abstract. It is indispensable to be able to interpret the organization of a given teaching in terms of choice, in order to be able to identify their consequences on the meaning of the introduced objects and on students' learning. This article first presents the study of the place of area in the teaching of integral calculus at the beginning of university in seven reference textbooks. We bring to light three possible plans of filiations and breaks between the various types of integrals taught and the notion of area, connected to various meanings of the integral calculus. This study leads us to make a praxeological analysis of the types of tasks related to the institutional choices made in first year of university teaching in Algeria, before considering the feeling that students have about integral calculus.

MONCEF ZAKI & ZAHID ELM'HAMED, *Elements of measure for teaching statistical tests*

Abstract. Statistical tests have traditionally been an important tool in the statistical analysis of data. However it is widely recognized, at least in the university medium, that the teaching of this concept is difficult for the teacher as well for the learner. Indeed, the literature of didactic research on statistical tests has revealed that there are various difficulties, often with respect to some misconceptions, which are encountered at every age and level of expertise. We start with the assumption according to which the teaching of statistical tests cannot succeed in the absence of situations allowing the apprehension of the meaning behind the procedures involved in this concept. This paper synthesizes some supporting measures that can be taken into account in the teaching of statistical tests, and presents the results of an exploratory study conducted on 3rd year students at a scientific university. These measures will, a priori, help students to deepen their understanding of statistical tests.

CHARALAMPOS LEMONIDIS, IOANNIS PANAGIOTOPOULOS, KONSTANTINOS NIKOLANTONAKIS, *Greek teachers facing realistic problems – Teachers' characteristics that influence realistic answers*

Abstract. In opposition with traditional school problem, solving realistic problem needs a critical consideration of the statement, based on everyday experience. Much research has been made on realistic problems in order to examine pupil's behaviour. Almost all researchers conclude that the solutions of realistic problems given by pupils and prospective teachers are founded on didactic contract and do not take in consideration everyday experience for judging the data in the statement. There was not any research about in service teachers in order to examine their progress on realistic problem solving and analyse the factors of this progress, thus we examined the behaviour of 162 in service Greek teachers regarding realistic problems. We also examine what teachers' characteristics among: gender, academic level, teaching experience, and preference for mathematics, determine their behaviour in realistic problem solving.

LUCIE DEBLOIS, *Contexts and needs at the origin of collaborative research*

Abstract. The goal of this study was to discuss the characteristics of collaborative research to

identify/determine the conditions contributing to achieving this type of research. In light of pedagogical reforms and teachers' reactions have led school districts to provide "a la carte" training. It is therefore important that both schools and teachers participate in these types of professional development activities that provide useful results for teachers as well as researchers. Three groups of mathematics teachers participated at this research project. The thinking that emerged enabled us to identify the benefits, challenges, and conditions of this type of research.