

ABSTRACTS

**KARINE MILLON-FAURE, MARIE-NOËLLE ROUBAUD, TERESA ASSUDE.** ENTRER DANS UN GENRE PROCEDURAL : L'ECRITURE D'UN PROGRAMME DE CONSTRUCTION EN GEOMETRIE.

**Abstract. The discovery of a procedural genre: the writing of a program of construction in geometry.** The writing of a program of geometrical construction is a particular kind of task in so far as it requires the respect of some strict expectations in addition to mathematical work. Thanks to analysis of in-class sessions in primary school, we wonder how three pupils with difficulties appropriate these expectations and succeed in (or do not succeed in) overcoming various obstacles in order to enter in this specific genre.

**THOMAS BARRIER, AZZEDINE HAJJI.** EXEMPLE, EXPLICATION ET PROCESSUS DE DEMONSTRATION

**Abstract. Example, explanation and proving.** The article looks at the proving process in mathematics from a didactic perspective. The study seeks to identify what metamathematics knowledge is at stake when mathematicians produce proof of implications with universal quantifiers. For this reason, we propose a modelling of the proof process – from the manipulation of examples to the finished product – based on dialogic logic tools. This modelling leads us to a characterization of the enunciative position which is needed to elaborate proofs. The results are derived from two cases: one in arithmetic integers, another in plane geometry. Their comparison allows us to discuss the limits of a transversal approach to this meta-mathematical knowledge without taking into account the specificity of mathematical fields.

**FERNANDO HITT, SAMANTHA QUIROZ RIVERA** FORMATION ET EVOLUTION DES REPRESENTATIONS FONCTIONNELLES-SPONTANÉES A TRAVERS UN APPRENTISSAGE SOCIOCULTUREL

**Abstract. Training and Evolution of Functional-Spontaneous Representations through Sociocultural Learning.** The present research aims to understand the role of the students' functional-spontaneous representations through the study of the pupils' external spontaneous representations in the process of solving a problem research situation. Through a qualitative methodology, the spontaneous representations of secondary students in the learning of covariation between variables are analysed. A particular goal is to study how these representations are likely to evolve through internal communication of students and through communication and validation with their pairs. Hence the importance of having a method that promotes a social construction of learning. In our case, we have opted for a learning process in a sociocultural environment: ACODESA (Collaborative Learning, Scientific Debate, Self-reflection and Institutionalization). From this perspective, in this paper, we consider collaborative research that allows the researcher to acquire knowledge about the teacher's practice, and vice versa, the teacher acquiring research knowledge in the mathematics classroom through the evolution of pupils' representations. The results show that the functional-spontaneous representations are the engine of the learning process of mathematical concepts.

## DYANA WIJAYANTI ANALYSING TEXTBOOK TREATMENT OF SIMILARITY IN PLANE GEOMETRY

**Abstract.** This study presents a specific analysis of the treatment of the topic “similarity” by several college textbooks, in this case six Indonesian textbooks. The choice of this mathematical topic is justified by the fact that it requires in the activity of the pupils an implementation of both the geometric register and a numerical register, that of ratios and proportions. Thus, it is appropriate for the development of a general validity reference model, which will require further studies. The two points of theoretical support in the present study were the epistemology of the mathematical topic under consideration and the notion of praxeology, pertaining to the anthropological theory of the didactic. In addition to the meticulous review of textbook contents, the sketched model allowed us to evaluate the proximity of similarity treatments in a textbook and in the formal assessments of students at the end of college.

## ZAHID ELM'HAMEDI EFFETS DU VOCABULAIRE ET DE L'AMBIGUÏTE LINGUISTIQUE SUR LA COMPREHENSION DES TESTS STATISTIQUES

**Abstract. Effects of vocabulary and linguistic ambiguity on the understanding of statistical tests.** It is widely recognized, at least in the university medium, that the teaching of statistical tests is difficult for the teacher as well as for the learner. Indeed, the literature of educational research on this tool has revealed that there are various difficulties, often associated to some misconceptions, which are encountered at every age and level of expertise. The research findings show that a student cannot generally understand and describe the fundamental ideas underlying the practice of statistical tests. Instead, students generally rely on mechanical calculus, which is based much more on memorization and computation, than on reflection and interpretation. The aim of this paper is to present some factors that bring difficulties in apprehension to this practice and that must be considered in its teaching. Very specifically, we focused in this paper on the effect that the *vocabulary and linguistic ambiguity factors*, used in statistical tests, could have on the interpretation by our students of the notions and expressions conveyed during the teaching of this practice.

## ISABELLE BLOCH, PATRICK GIBEL A MODEL TO ANALYZE THE COMPLEXITY OF CALCULUS KNOWLEDGE AT THE BEGINNING OF UNIVERSITY COURSE PRESENTATION AND EXAMPLES

**Abstract.** Our research focuses on the difficulties students encounter with the learning of calculus, considering that they have to cope with many more mathematical objects but also with new ways of reasoning – not only algebraic calculation, but also the practice of approximation, and a scaffolding way of using functions, limits, derivative, integrals, etc. to justify their answers. The semiotic facet of new objects, and the way to manage it, is also a source of great difficulties. In this article we establish that the model we built (Bloch & Gibel, 2011) is adequate to describe the work of University students who have to deal with the resolution of exercises about parametric curves and differential equations, even if this context is not an adidactical situation. In 2018, L2 students of Pau University were asked to solve little problems about limits, integral calculations or recurrence questions. They revealed difficulties to organize their knowledge and conclude about a limit, for instance. We give some examples of these troubles. We conclude for the necessity to implement adequate devices to help students better understand these 'new mathematics'.