

## Teaching Practices for Subverting Significant Retentive Learner Errors in Arithmetic

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**Abstract :** The systematic identification of the most conspicuous and significant errors made by learners during three-years of testing of their progress in learning Arithmetic throughout the development of the Kassel Project in England and Greece was accomplished. How much retentive these errors were over three-years in the officially provided school instruction of Arithmetic in these countries has also been shown. The learners' errors in Arithmetic stemmed from a sample, which was comprised of two hundred (200) English students and one hundred and fifty (150) Greek students. The sample was purposefully selected according to the students' participation in each testing session in the development of the three-year project, in both domains simultaneously in Arithmetic and Algebra. Specific teaching practices have been invented and are presented in this study for subverting these learners' errors, which were found out to be retentive to the level of the nationally provided mathematical education of each country. The invention and the development of these proposed teaching practices were founded on the rationality of the theoretical accounts concerning the explanation, prediction and control of the errors, on the conceptual metaphor and on an analysis, which tried to identify the required cognitive components and skills of the specific tasks, in terms of Psychology and Cognitive Science as applied to information-processing. The aim of the implementation of these instructional practices is not only the subversion of these errors but the achievement of the mathematical competence, as this was defined to be constituted of three elements: appropriate representations - appropriate meaning - appropriately developed schemata. However, praxis is of paramount importance, because there is no independent of science 'real-truth' and because praxis serves as quality control when it takes the form of a cognitive method.

**Keywords :** arithmetic, cognitive science, cognitive psychology, information-processing paradigm, Kassel project, level of the nationally provided mathematical education, praxis, remedial mathematical teaching practices, retentiveness of errors

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