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An innovative model for developing critical thinking skills through mathematical education.

Paditz, Ludwig (ed.) et al., Proceedings of the 10th international conference “Models in Developing Mathematics Education”, Dresden, Saxony, Germany, September 11–17, 2009. Dresden: Hochschule für Technik und Wirtschaft (ISBN 83-919465-9-2). 19-22 (2009).

Summary: In a challenging and constantly changing world, students are required to develop advanced thinking skills such as critical systematic thinking, decision making and problem solving. This challenge requires developing critical thinking abilities which are essential in unfamiliar situations. A central component in current reforms in mathematics and science studies worldwide is the transition from the traditional dominant instruction which focuses on algorithmic cognitive skills towards higher order cognitive skills. The transition includes, a component of scientific inquiry, learning science from the student’s personal, environmental and social contexts and the integration of critical thinking. The planning and implementation of learning strategies that encourage first order thinking among students is not a simple task. In an attempt to put the importance of this transition in mathematical education to a test, we propose a new method for mathematical instruction based on the infusion approach put forward by *R. Swartz* [“Critical thinking, the curriculum, and the problem of transfer”, in: D. Perkins (ed.) et al., *Thinking: the second international conference*. Hillsdale, NJ: Lawrence Erlbaum, 261–284 (1992)]. In fact, the model is derived from two additional theories, that of Ennis (1989) and of Libermann and Tversky (2001). Union of the two latter is suggested by the infusion theory. The model consists of a learning unit (30 hours) that focuses primarily on statistics every day life situations, and implemented in an interactive and supportive environment. It was applied to mathematically gifted youth of the Kidumatica project at Ben Gurion University. Among the instructed subjects were bidimensional charts, Bayes law and conditional probability; Critical thinking skills such as raising questions, seeking for alternatives and doubting were evaluated. We used Cornell tests to confirm that our students developed critical thinking skills.

Classification: D30 C30

Keywords: critical thinking; goals of mathematics education; general education; case study