

The Sowder Mathematics and Science Education Research Seminar Series 2015-2016

Science and Mathematics Learning and the Problem of Conceptual Change



Dr. Stella Vosniadou

Strategic Professor in Education
School of Education
The Flinders University of South Australia

Monday, March 7, 2016

Seminar: 10:00 am – 11:00 am

Q&A: 11:00 am – 11:30 am

Pacific Hall (Room 3500)
UC San Diego

I will argue that we have been caught in a false debate between ‘coherence’ and ‘fragmentation’. Our knowledge systems are neither totally coherent nor totally fragmented. I find the idea of p-prims interesting but I argue that to the extent that we postulate the existence of such ‘sub-conceptual’ primitives, they do not remain fragmented in the knowledge system of novices but become organized in conceptual structures with some coherence and explanatory power. Categorization is a fundamental learning mechanism, well developed by the time children have acquired language, and, with it, a rudimentary conceptual system, which, however, is implicit and not subject to metaconceptual awareness. I argue that this initial rudimentary conceptual system continues to exist even when scientific and mathematical concepts have been acquired and that it interferes in the learning of science and mathematics. I will also argue that there is a failure in teaching to deal with this ‘duality’ – i.e., between initial and scientific understandings – which is often exhibited in inert knowledge, fragmentation, biases, and misconceptions. I will end with some thoughts about the broader implications of this analysis and about instruction.

Please join us for a more informal discussion with Dr. Stella Vosniadou during our “Coffee and Chat” session from 2:30 pm – 4:00 pm in the Natural Sciences Building (Room 3203).

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Contact: Thomas Bussey (tbussey@ucsd.edu)