

WS3 MODELS AND MODELING WORKING SESSION

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In the Models & Modeling Working Group (M&MWG), we wish to continue investigating the nature of math/science understandings and abilities that provide foundations for success beyond school in a technology-based age of information. One of the research methodologies approached in this working group are the multi-tier design experiments, modeled after research designs that are familiar in design sciences such as engineering, but that have been relatively unknown in educational research. Multi-tier design experiments were created to enable multiple researchers at multiple sites to investigate the kind of complex systems that are involved in the interacting development of students, teachers, and programs of instruction. Model-eliciting activities are 3-12 grade versions of the kind of “case studies” that are often emphasized for both learning and assessment in most future oriented fields like aeronautical engineering and business management. They are simulations of “real life” situations where mathematical and scientific thinking is needed for success beyond school in the 21st century.

The M&MWG has provided a rich context for a variety of topics in Mathematics Education, for example: student development, teacher development, research design, curriculum development, assessment, and problem solving. All of these themes will be discussed during the working sessions at PME27. For each theme, there will be invited speakers who will give a 5-minute presentation on highlights of their work. There will be 3-4 speakers for each session. After their brief presentations, we will break into smaller groups where all the participants will have an opportunity to discuss the presented topics. These discussions have served as a setting to encourage future work and research.

The invited speakers are researchers who have participated in the M&MWG in past years. Some projects and publications achieved by these participants in the past year are: *Beyond Constructivism: A Models & Modeling Perspective on Mathematics Problem Solving, Learning & Teaching* (Lesh & Doerr, 2003), an accompanying website with interactive presentations for each chapter in the book (<http://tcct.soe.purdue.edu>), two special issues on Models & Modeling for the *International Journal of Mathematical Thinking and Learning* (English, 2003), presentations at the 11th International Conference on Teaching of Mathematical Modelling and Applications (http://www.mscs.mu.edu/~sue/ICTMA/ictma_11.html), and new coordinated projects, like the NSF funded Project of the Design Sciences for Human Learning, with Eamonn Kelly and Richard Lesh as Principal Investigators (<http://gse.gmu.edu/research/de/>).