WS01: DEVELOPING ALGEBRAIC REASONING IN THE EARLY GRADES (K-8): THE EARLY ALGEBRA WORKING GROUP

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The Early Algebra Working Group's focus is on investigating and describing what we construe as the possible geneses of algebraic reasoning in young children, and in developing and investigating ways to enhance that reasoning through innovative instruction, applications of appropriate technology and professional development for teachers. The EAWG was formed in response to a call from the International Commission on Mathematical Instruction (ICMI) to hold a study conference on "The Future of the Teaching and Learning of Algebra" in December of 2001 in Melbourne, Australia. Following that initial conference, the group has conducted working sessions at PME-NA XXIV in Athens, Georgia, 2002 and at the joint PME 27/PME-NA 25 meeting in Hawaii, 2003.

PLANNED ACTIVITIES FOR PME 28

We plan to hold two 90-minute sessions during which examples of different approaches to fostering algebraic reasoning in young children will be described and discussed. The following researchers have agreed to provide examples: Sergei Abramovich from SUNY at Potsdam (the use of a computer graphics program to enhance second grade students' algebraic thinking), Sybilla Beckmann from the University of Georgia (activities from the Singapore grades 4-6 mathematics text), Barbara Dougherty from Hawaii University (interim results from the "Measure Up" project) and Paul Goldenberg (Education Development Center's materials that are based on an approach envisioned over 40 years ago by WW Sawyer). Participants will engage in prototypical activities from each project followed by discussions of each approach. The following questions will be used to guide these discussions:

1. What are cross-cutting themes (or dissimilarities) of how algebraic thinking is enacted across these activities? What can we learn from this?

2. What are the broader algebraic content issues that need to be addressed? What do we know about what students can do algebraically? What needs further research?

3. What are the policy/implementation/curricular issues that affect the integration of algebraic thinking in the elementary grades?

4. What conversations need to occur and how can they be initiated with secondary mathematics so that algebraic thinking is a connected agenda across K-12? What is currently being done to facilitate this?

5. What do we know about how early algebra impacts student learning in secondary mathematics? What kind of research activities are needed to address this question?