PROBLEM SOLVING: TEACHING, ASSESSING AND TEACHER EDUCATION

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1. MAIN GOALS
   - Developing and analyzing heuristic methods of instruction in mathematical problem solving, particularly through the utilization of problem-solving strategies.
   - Developing and investigating assessment methods and techniques, coding schemes and rubric scales which take into account the complexity of mathematical problem solving and, particularly, processes involved when students are attacking the solution to a problem.
   - Developing and investigating materials which are designed for education of mathematics teachers under a problem-solving perspective.
   - Analysing effects of programs of instruction which emphasize problem solving on teacher's attitudes, conceptions and pedagogical skills, and on elementary and secondary student's attitudes, conceptions and performances.

2. PARTICIPANTS
   - About 120 pre-service teachers who are in their junior or senior year.
   - About 140 in-service teachers from five distinct regions of the country.
   - About 700 elementary and secondary students of a sample of 24 teachers.

3. GENERAL PROCEDURES
   - First Year - Teaching step: heuristic methods of instruction in mathematical problem solving will be investigated in the preservice mathematics teachers context; materials will be developed to be used in the education of in-service teachers.
   - Second Year - Assessment step: assessment models and techniques will be investigated in the preservice mathematics teachers context; materials will be developed to be used in the education of in-service teachers.
   - Third Year - In-service Teacher Education/Teaching/Assessing Step: effects of the previously developed materials on mathematics inservice teachers' attitudes, conceptions and pedagogical skills will be investigated; also, the attitudes, conceptions, processes and performances of the students of those teachers will be analyzed.

4. METHODS AND INSTRUMENTATION
   - Qualitative methods will be used to analyze teachers' and students' conceptions, attitudes, and processes.
   - Quantitative methods will be used to compare students' means on problem-solving tests.
   - Instruments: observation grids, interview protocols, checklists, coding schemes, rubric scales, and mathematical problem-solving tests.

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