

THESIS TITLE: THE DEVELOPMENT OF A MATHEMATICS INSTRUCTIONAL MODEL WITH  
THE EMPHASIS ON MENTAL COMPUTATION SKILLS AND COOPERATIVE  
LEARNING ON MULTIPLICATION AND DIVISION FOR PRATHOM SUKSA  
IV STUDENTS AT BANPAKCHONG-PA-BIAD SCHOOL UNDER THE  
JURISDICTION OF CHAIYAPHUM PRIMARY EDUCATION OFFICE

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### Abstract

The purposes of the study were 1) to develop a mathematics instructional model with the emphasis on mental computation skills and cooperative learning, 2) to develop learning achievement in mathematics and 3) to develop mental computation skills on multiplication and division for Prathom Suksa IV students.

The target group in the study comprised of 45 fourth-year students in Banpakchong-Pa-Biad School, Khonsarn District, Chaiyaphum Province, during the first semester of the 1997 school year.

The instruments used in the study comprised of 1) the

experimental instrument which included 25 lesson plans for teaching mathematics with the emphasis on the development of mental computation skills and cooperative learning, 2) the instruments to reflect the treatment included field notes of teaching and learning and their activities, drills and quizzes, and 3) the instruments to assess the efficiency of the model which included a learning achievement test and a mental computation skill test.

The study was an action research. There were four spirals involved, i.e. the first to the fourth which covered lesson plan 1-7, 8-13, 14-19, 20-25, respectively. To collect data, the present researcher made notes, observed and interviewed the students. At the end of each spiral the students were given a quiz to assess their progress and to give the researcher and her assistant a feedback. After that the data obtained from observation, note making and interviews were analyzed to readjust the lesson plans.

The results of the study:

1) An instructional model for mathematics had been developed with the emphasis on the development of mental computation skills and cooperative learning. The model comprised of five major steps as follows: 1) The introduction. In this step the learners do the mental computation drills using the techniques they have acquired previously. Next the teacher presents the behavioral objectives to the class and reviews the learners' past knowledge of the subject to be taught; 2) the class presentation. This is a concept and mental computation development step which is separated further into five sub-steps of facing the situations, understanding the situational problems, exploring ways of solving the problems, practicing skills and organizing activities for the development of mental computation skills; 3) the

conclusion. In this step the teacher sums up the concept, the knowledge of the subject on principles that have learned in each of the class period; 4) small-group study. This is a skill development step where the learners are separated into small groups, study the subject content cards, do activities as stated on the activity cards and find the answers from the key cards; 5) the application. At this step, the learners further develop their application skills of what they have learned to cope with new situations through drills.

2) The students who were taught mathematics under the model which emphasized mental computation skills and cooperative learning made a higher learning achievement of 72.81 percent which was higher than the expected criterion of 70 percent. Furthermore, 82.22 percent of the students passed the expected criterion while the expected passing percentage was 80.

3) The students had attained a higher mental computation capability of 74.31 percent which was higher than expected percentage of 70; and those who passed the expected criterion accounted for 80 percent of the group.

4) The students had developed certain desirable attributes, i.e. small-group working skills, sense of responsibility for one's own action as well as for the group to which they belong and mutual assistance.