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PATH ANALYSIS / CONCEPT MAPS

CHANASAK BAITIANG : THE DEVELOPMENT OF PREREQUISITE MODEL IN
BASIC MATHEMATICS COURSES FOR SCIENCE AND TECHNOLOGY
UNDERGRADUATE CURRICULA BY USING CONCEPT MAPS.

THESIS ADVISOR: ASSO. PROF. PORCHULEE ACHAVA-AMRUNG, Ed.D.

THESIS COADVISOR PROF. YONGVIMOL LENBURI, Ph.D. 208 pp.

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The Purpose of this study was to construct the concept maps in basic mathematics courses for science and technology undergraduate curricula and used them as the basis for developing the prerequisite model. This causal model consists of two exogenous variables and five endogenous variables. The prerequisite model developed was based on empirical data analyzed by LISREL programs. The sample consist of 384 engineering students in the faculty of Engineering, King Mongkut's Institute of Technology North Bangkok. Data were collected by using 3 tests. Basic statistics were used to analyze the background of samples. The LISREL program version 7.20 and 8.10 were used in testing the measurement of the effects, structural equations and the fitness of the model. The result were as follows. The developed model was consistent with empirical data with chi-square = 6.79 (df = 5) GFI = 0.995. Every path coefficients between the prerequisite topics had significant effects. Specifically, limits and continuities of the functions had the maximum total effects to derivatives of the functions, applications of derivatives, integrations, applications of integrations and solutions of nonlinear equations with the effects of 0.27, 0.45, 0.41, 0.45 and 0.15 respectively. Moreover, the direct effects limits and continuities of the functions still had the maximum effects to the other variables except the effects to applications of integrations which had the maximum effects from integrations. The best equation from the structural equations accounted for 50% of variances in applications of integrations by the independence variables: limits and continuities of the functions, derivatives of the functions, applications of derivatives, integrations and solutions of nonlinear equations.

In sum, the fitness of the model with empirical data indicates that the concept mapping is a tool for the development prerequisite models. The principles and theories of path analysis are productive in testing and developing prerequisite models so as to suggest an appropriate order of the contents in individual course or curriculum in higher education as possibly other levels as well.

ภาควิชา.....อุดมศึกษา

สาขาวิชา.....อุดมศึกษา

ปีการศึกษา..... 2539

ลายมือชื่อนิสิต..... *Chanasak Baitiang*

ลายมือชื่ออาจารย์ที่ปรึกษา..... *พรชวี อัจฉอรัง*

ลายมือชื่ออาจารย์ที่ปรึกษาร่วม..... *ยงวิมล เลนบุรี*