The study of this research was to develop a complexity index for solving achievement test item and to study the criterion related validity of a complexity index for solving achievement test item. This research had two subject groups : 1) 27 environmental instructors in the Ministry of University Affairs and 2) 127 students from Chulalongkorn University who registered "Our Environment" course and 183 students from Yonok College who registered "Man and Environment" course during the 1996 first semester. The instruments used in data gathering comprised of 3 instruments which developed by the researcher: 1) the instrument for developing a complexity index for solving achievement test item was achievement test items for "Territorial Ecosystem", "Environmental Law", and "Developmental Project and Evaluational Impact Assessment" topics, 2) the instrument for gathering the strategies for solving achievement test item was an interview schedule, and 3) the instrument for classifying the basic environmental knowledge of the undergraduate students was the basic environmental test. The data were analyzed by computing the probability of solving achievement test item strategies, estimating item parameters of graded response model with MULTILOG computer program and computing pearson's product-moment correlation coefficient between complexity index for solving achievement test item and item parameters of graded response model with SPSS/PC computer program.

The results of this research were as follows :
1. The formula of computing the complexity index for solving achievement test item was the summation of the probability of solving problem strategies which composed of set of the probability of subtasks.
2. The complexity index for solving achievement test item had criterion-related validity with item parameters of graded response model.

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