

An application of the rule space theory for a computer adaptive diagnosis and instruction (CADI) system

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Abstract.

This paper is to show how assessment and instruction could be integrated into an e-learning system, named a 'Computer Adaptive Diagnosis and Instruction (CADI)', which incorporates computer adaptive test and computerized instruction. Specifically, it is to show how rule space theory(Tatsuoka, 1983, 1985; Tatsuoka and Tatsuoka, 1987), a cognitive diagnostic measurement theory, could be applied to integrate testing and teaching into a computerized learning system.

Five sections are presented. They are to answer why and how e-learning system is adopted, how CADI is modeled conceptually, how CADI is realized, what the basic concepts of rule-space theory are, and what the expected contributions and limits are.

First, e-learning system was argued for its capacity of loading, computation, communicability, and accessibility. Second, CADI is conceptually modeled with five steps - planning and learning, diagnostic assessment, consulting for remedy, remedial instruction, confirming and terminating. Third, a computer assisted instruction program, named "Moti", is introduced along with each step of CADI. Fourth, rule space theory is briefly introduced with the key concepts - attributes, Q-matrix, knowledge states, bug distributions, and classifications. Fifth, among contributions are learning intrinsic motivation and the above capacities. Limits are discussed for further studies.