



APPLICATION OF COGNITIVE DISSONANCE
IN THE TEACHING OF FORTRAN IV
IN AN UNSTRUCTURED SETTING

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An experiment in the teaching of FORTRAN IV using cognitive dissonance in an unstructured setting was conducted at Montgomery College. "Classical" instruction, in the form of lecture sessions proceeding in an orderly manner from simple to more difficult algorithms, was compared to the "experimental" method, in which students were given sample programs and ordered to create solutions to assignments using the sample programs as models, with no formal lectures in FORTRAN. The students in the experimental group thus became very familiar with their course materials, and their need for instructional assistance fell off rapidly. Statistical results showed that the groups acquired equal grasp of the fundamentals of FORTRAN, but the experimental group indicated a greater depth in the subject. We have shown that the teacher can be more helpful to his students by creating challenging and instructive assignments which encourage them to expand their knowledge of the time-saving features of the FORTRAN language, rather than by, in effect, holding them back with a structured technique.

A FLEXIBLE APPROACH TO TEACHING FORTRAN

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The demand by students from all academic disciplines to obtain a basic knowledge of a computer programming language is increasing at an exponential rate on most university campuses. The Systems Analysis Department at Miami University is currently teaching approximately eighteen sections of introductory FORTRAN programming each school year. A concerted effort is

now being undertaken in an attempt to design instructional materials and methods which will allow a gross reduction in the teaching load generated by this growing demand. The purpose of this paper will be to discuss the current status of this research effort at Miami University. The objective of this research is to determine if introductory FORTRAN can be taught with little or no emphasis on the lecture recitation mode of instruction. The author outlines the experimental methods he will be using in a controlled experimental approach during the coming school year.

EXPERIENCES WITH INTERSESSION COURSES
IN COMPUTER SCIENCE

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During the past two academic years, Worcester Polytechnic Institute has organized its school calendar to allow for a three-week intersession period in January during which short (one- to three-week), high-intensity courses on a variety of subjects were offered. Attendance was open to all segments of the undergraduate student population on a voluntary basis, with possible academic credit. Four courses were offered in Computer Science. Two of these with course titles, Minicomputers and Maxicomputers, were held in cooperation with nine area corporations that either are extensive users of computer systems or are computer manufacturers. The other two courses dealt with teaching the BASIC and SNOBOL programming languages. The students were involved for eight to twelve hours for three days with three of the courses and six days for the SNOBOL course. Experience with the courses thus far indicates that they were very popular as choices, and well received by the students. Availability of credit was not an important factor in course selection. However, heterogeneity in class population lead to some problems in the types and levels of presentations, and the intensity of the course was sometimes fatiguing to both the students and the faculty.

A STATISTICAL SURVEY ON THE CAI
THERMODYNAMICS AT U. S. NAVAL
ACADEMY

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U. S. NAVAL ACADEMY

A computer-aided instruction in thermodynamics has been developed at U. S. Naval Academy for teaching a number of midshipmen individually. The ultimate goal of the course is to contribute to increasing the quality and effectiveness of the teaching and the learning process in thermodynamics. Some of the objectives to be achieved include (a) to improve the relationship between the faculty and the student, and (b) to measure and evaluate the effectiveness of various CAI techniques. The general scope of the course, the equipment used, and the development of the course are described. A questionnaire containing 39 items has been distributed to those midshipmen who took CAI thermodynamics course in the past; 42 students have responded. Based on the opinions of the students for whom the CAI system is designed, a statistical survey has been made. The course has since been modified and restructured in accordance with the student's suggestions.

DESIGN SPECIFICATIONS FOR AN
INFORMATION RETRIEVAL SYSTEM MANAGEMENT GAME

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An information retrieval system providing current awareness services is currently being designed within the framework of a management game. This management game, a computerized, non-competitive game, is purported to train the game player in the role of designer and manager of an information retrieval system. A general model of an information retrieval system will be developed which considers the macro components of such a system, i.e., data base, software, hardware, costs, number of users, etc. The game player initially specifies the system configuration and his policy decisions. During the development and operation of the information retrieval system, the player may maintain or modify the current system configuration and policies for the next time period based on periodic statistical output. A cost effectiveness function to evaluate the game player will also be developed which will measure learning interpreted as improvement in decision making skills.

INNOVATIVE TECHNIQUES FOR COLLEGE FACULTY
USING THE COMPUTER
IN UNDERGRADUATE CURRICULA

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The inspiration for the development of computer applications in service to man has many origins. Computer-related curricula materials successfully integrated into a wide variety of undergraduate classroom situations provide one major vortex for this inspiration for both faculty and students. The vital initial steps are the appropriate education of the faculty by "Computer Instructional Applications Professionals" in preparation for their subsequent creation of computer-related materials and then assistance by these people in the actual creation of these materials. This paper describes efforts in: defining and carrying out appropriate education, computer curricula development and evaluation, project assistance, and extensive statistical evaluation of the results of all steps. Sending participants in faculty workshops away with a well-defined concrete project, well on to completion, results in success for on-going later development. Not every college professor becomes an expert programmer, but all can become expert in using the resources provided.
