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ABSTRACT

In presenting the state of the art of the computer in guidance programs, it is maintained that there are many potential uses for computers in career decision making. Four types of computer-involved guidance systems were in use in 1970: indirect inquiry systems, direct inquiry systems without system monitoring, direct inquiry with system monitoring, and direct inquiry with system and personal monitoring. Of the 25 to 30 systems existing then, only five remain. They are direct inquiry systems, and all but one are directed to secondary school students. They are cost feasible, use standard terminal equipment, and specialize in providing career decision making information, retrieval, sorting, and synthesis. DISCOVER is the newest computer-based guidance system under development in the United States. It differs from other systems in objectives, functions, and population. Further developments in the field are anticipated involving self-initiated, self-directing, self-correcting learning, based on the theory that only each man can help himself. (AG)

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THE COMPUTER AND GUIDANCE IN THE UNITED STATES:

PAST, PRESENT AND A POSSIBLE FUTURE

by

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and

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THE COMPUTER AND GUIDANCE IN THE UNITED STATES: PAST, PRESENT AND A POSSIBLE FUTURE

Possibility of, and Need for, Computer Involvement in Guidance

Business revolutionized its procedures with the help of computers in the 1950's. Education has been more resistant to a similar revolution. By 1960, education somewhat involved computers in administrative and clerical tasks such as scheduling, payroll accounting, and production of report cards. But the use of the computer by the student himself, for either computer-involved instruction or guidance, was a later development, having its genesis about the mid-sixties and remaining precarious as to continuation even today. Despite present uncertainty about continuing computer involvement in guidance in the United States, we believe strongly in its value. We therefore present the state of the new art in the States and make some forecasts about its future.

Computers have several capacities of high potential value in career decision making. These capacities include:

1. The capacity to store, instantaneously retrieve, and update masses of data. This capacity is particularly significant in a nation which has more than 2500 two-and four-year institutions of higher learning, thousands of proprietary schools, and 21,741 occupations identified in the last edition of the Dictionary of Occupational Titles.
2. The capacity to interrelate data about the person and data about the environment so that both are personally relevant to the user at the time of his decision making.
3. The capacity to sort through masses of data on the basis of such matches and to provide a personally-tailored list of educational or vocational options upon command.
4. The capacity to simulate a conversation or structured interview by the use of phone lines and interactive terminal devices, such as typewriter terminals or cathode ray tubes.
5. The capacity to monitor use of the system in order to provide feedback, review, and personalized assistance to a counselor or to the client himself.
6. The capacity to control and coordinate audio and visual material with text.
7. The capacity to provide an individualized package of services to many users simultaneously, for many hours each day, and in a wide variety of settings.

The value of such capacities seem almost self evident in the United States considering its inadequate number of guidance personnel and the kinds of non-career duties which many employed counselors currently perform. There is a wide variation in the counselor student ratio in our nation. A desirable ratio is considered to be 1:300, but the ratio which is reality for many of our large-city schools is 1:1000. Clearly, with either ratio, it is difficult for a counselor to provide good, sufficient, updated information to counselees about the thousands of options open to them in the processes of career choice and development. Further, the counselor's role at secondary level in public schools suffers from lack of clear formulation and acceptance. The result is that many administrators view the counselor as a quasi-administrative person and delegate to him such functions as course registration, schedule changing, attendance keeping, discipline, and record maintenance. Deliberate career decision making education therefore largely loses by default in U. S. schools.

Enter the Computer.

Types of Computer-Involved Guidance Systems in the United States

By 1970 the computer achieved sufficient significance in the United States guidance services for the National Vocational Guidance Association to propose guidelines for the use of computers in guidance. The 25-30 computer-involved guidance systems which were in existence at that time are divided into four kinds:

1. Indirect inquiry systems;
2. Direct inquiry systems without system monitoring;
3. Direct inquiry with system monitoring; and
4. Direct inquiry with system and personal monitoring.

In an indirect inquiry system the user completed a questionnaire on which he enters data about himself and indicates the characteristics of educational institutions, financial aids or occupations which he seeks. Such systems are normally characterized by the following:

1. The user's request is held at a central location until a sufficient number of such requests have been received to warrant processing, a

procedure normally called "batch processing." This may cause the user to wait hours, days, or weeks before receiving feedback.

2. The user, due to time and cost considerations, normally only submits his query once.
3. The user does not know which of his chosen characteristics limits or affects his options and therefore does not have studied opportunity to alter these in order to receive different or increased options.
4. The user does not receive counseling or assistance with decision making other than that contained in printed instructions.

In a <u>direct inquiry system without system monitoring</u>, the inquirer has direct access to the data file because he makes use of a terminal device connected directly to the computer. The user accesses the data file with the help of instructions and code words available at the terminal or in complementary manuals. These systems are ordinarily programmed so that a list of schools or occupations cannot be called until the user reduces the possible number of items in the list to a predetermined somewhat small number by specifying the characteristics which his items must have. Such systems therefore ordinarily report the number of items or options still remaining on the list after the user makes each selection of an additional characteristic in order to let the user know what selection does to his possibilities. Characteristics of direct inquiry systems without monitoring are:

1. The inquirer's request for data receives almost instantaneous attention.
2. The inquirer's use of the system may be multiple or sequential, with immediate or later alteration of specified characteristics in order to produce different sets of options.
3. The inquirer is constantly aware of how his chosen characteristics

are altering or diminishing his list of open options.

4. There is no "within system" counseling for the user but such systems are normally designed to promote counselor participation and collaboration.

Monitoring, in computer systems usage, results from the overseeing capability of the computer program which keeps a record of alternatives chosen by the user, has pertinent data about the user himself, relates these data to the chosen alternative, comments on the consistency of these two in accordance with a decision table determined by the systems designer, states the probability of success in appropriate alternatives, and/or reviews a path of decision making. Such functions, programmed by the systems designer, simulate a formalized type of counseling. Direct inquiry with monitoring systems, therefore, take advantage of these kinds of capabilities and are more likely to make use of a visual display device, such as a cathode ray tube or filmstrip projection, rather than a teletype or printer device. These systems have the characteristics of the direct inquiry without monitoring systems, as well as the following:

1. The user has at his command a variety of scripts, approaches, modes, and branching opportunities which allow him experiences in addition to data file retrieval and successive possibility definition.
2. The data files generally can be accessed by various means and search strategies.
3. The system typically stores data about the user himself which can be meshed with data about educational and vocational options in order to generate personalized or new data.
4. The system provides some formalized counseling through monitoring.
5. The system monitors the decision-making path of the inquirer and

displays it for him and sometimes for counselors as well.

The fourth type of system, <u>direct inquiry with system and personal monitoring</u>, has the above characteristics and in addition:

1. The system contains instruction in deliberate career decision making.
2. The system permits the user to store data about himself to use in his later career decision-making.
3. The system permits the user first to personalize and later to use its original monitoring procedures to supervise his own decision making.

Current Status of Systems in the United States

At this time only one indirect inquiry system is in operation in the United States. Approximately fifteen other commercial indirect inquiry systems have already gone out of business.

Seven direct inquiry systems are in operation, three with monitoring and four without. Five of these seven systems are briefly described in Exhibit 1 of the handout. Detailed information can be obtained from the persons cited there for each system.

The Information System for Vocational Decisions (ISVD) which Tiedeman directed was the only example of a direct inquiry system having both system and personal monitoring available. The System existed in prototype form in 1969 but its operation has so far not proven financially feasible. ISVD therefore largely exists in Tiedeman's head today, a condition he later capitalizes as the futurist which his ISVD experience made him become.

It should markedly chasten international computer buffs to realize that of the 25-30 computer-based guidance systems which underwent development in the United States, only the five described in the handout predominantly remain in the field at this time. What have these hard financial lessons taught us in the States?

1. Systems which survive: (a) are direct-inquiry systems; (b) are directed to school populations at the secondary level, with the exception of SIGI; (c) are cost feasible; (d) make use of standard terminal equipment, and (e) specialize in providing information retrieval, sorting, and synthesis for the purpose of career decision making, although SIGI goes beyond this.
2. Direct inquiry computer-involved guidance systems are bought if they cost no more than approximately \$2.00 - \$6.00 per student hour of use. The inclusion of a variety of counselor-support and administrative-support functions to form an integrated educational package, such as was done in CVIS, holds high potential for minimizing the cost of student use by maximizing the cost savings and efficiency inherent in such functions as scheduling, schedule-changing, and attendance-keeping.
3. Computer-based systems enjoy positive evaluation. The following have been fairly universally true in the evaluation of systems: (a) students like to use computer-based systems, learn to operate them easily, and do not feel dehumanized or depersonalized by them (Harris, 1972); (b) parents accept computer-based systems with enthusiasm (Myers, et al, 1972); (c) students who use computer-based systems show an increase in vocational maturity, as measured by instruments of vocational maturity, specifically Super's Career Development Inventory (Harris, 1972; Myers, 1972); (d) students who use computer-based systems indicate that they gain greater specificity of information about options, increase their alternatives, come to

crystallization of vocational planning, and engage in a variety of exploratory behaviors to gain further information about career options (Harris, 1972); (e) some guidance-related functions (selection of high school courses and occupational exploration) can be as effectively done by a computer system as by counselors (Melhus, 1971; Price, 1971).

4. The use of computer-involved guidance systems is not widespread at this time. Interest, however, is increasing. The distribution of the CVIS package has doubled in the past year.

Project DISCOVER: Portent of Systems to Come

DISCOVER is the newest computer-based guidance system under development in the United States. Recognizing the success of the CVIS system in 1971, the IBM Corporation approached the State of Illinois Division of Vocational and Technical Education, the funding source of CVIS, about a joint contract for development of an even more comprehensive computer-based guidance system. Such a joint development effort was begun in fall, 1972, with a team made up of three guidance members of the CVIS staff and three systems analysts from the IBM Corporation. By June, 1973, the new system was conceptualized, described, and flowcharted. During the school year 1973-74, two guidance people have written a large portion of the interactive dialogues for the guidance subsystem. During 1974-75, the scripting will be completed and the guidance subsystem will be programmed with support from the United States Office of Education. Field test of the guidance subsystem and development of the counselor and administrative support subsystems are slated for 1975-76. The product will then be placed in public domain.

Why should a new system be designed when CVIS appears to be quite comprehensive and enjoying wide use? Some of the differences are:

a) DISCOVER will support sequential career development as opposed to simply providing information retrieval and interrelating functions as CVIS did; b) DISCOVER will therefore address new themes, such as value clarification and decision making, and use some new techniques, such as gaming and simulation; c) DISCOVER will be maximally designed for transportability in terms of data file construction, hardware configuration, and programming language; d) DISCOVER will make fuller use of personal data about the user to assist in career exploration and decision making; e) DISCOVER will make use of an on-line assessment instrument; and f) DISCOVER will make use of the technical improvements of 1975.

The system is conceived as having three separate functions, serving three different populations, but in a highly related manner. The first function of the system is to provide a sequential career guidance program for individuals from approximately age 10 through adulthood. This function is to be fulfilled by means of an interactive, on-line sequence of modular experiences which the user receives at a cathode ray tube terminal. The second function of the system is to provide a set of counselor-support services which would be delivered on-line to the counselor via a cathode ray tube terminal. The third function is to provide a set of administrator support services, some on-line and some in batch-processing mode. The career guidance program, though it could stand alone, is intended to be incorporated as an integral part of each school's guidance program. Project plans include the development of a comprehensive in-service training program, supported by audio-visual and printed materials, which will prepare an installation site for maximum use of the system.

The guidance subsystem of DISCOVER is divided into three components: the Grades 4-6 component, the Grades 7-12 component, and the Adult component.

Since the secondary level component is the only one currently slated and funded for development, further discussion is confined to that portion of the system. The user will enter the system through an entry module which will welcome him by name, review his prior uses of the system, and present the other modules which are available for his use. The user may determine his own sequence through the system, but a suggested path will be presented in the entry module in the order in which modules are listed in Exhibit 2 of your handout.

Imminent Immanent Possibilities for the Further Maturation of Humanness

Dr. Harris exemplifies the saccadic, quantum-like jump which is required to develop both a computer guidance system and a person. In transfiguring CVIS into DISCOVER, Dr. Harris considerably augments CVIS. But she finds that she cannot just add to CVIS, she has to refigure CVIS so that her additions can be used with CVIS in integrated fashion. A good deal of behavioral-modification educational pap to the contrary, the person has to do exactly that every time he transfigures himself from one form of environmental relationship into another. In humans, we refer to such saccadic, quantum-like developmental jumps as epigentic jumps. In so doing, we borrow the concept of determination from genetics but wrap the lifetime developmental changes which take place within the cloak of lifetime evolution therefore moving determination from person to being. The person lives, but the structural relationship the person maintains between his being and his environment can thereby change from time to time. But each time, the person's structural relationship to his environment changes, the individual must do the kinds of things which Dr. Harris illustrated in describing her switch from CVIS to DISCOVER; namely Dr. Harris reverted from the i-level of a functioning CVIS, to the i-1 level of CVIS functions, in order to bring useful i-1 level functions into i+1 DISCOVER functioning without old i-level CVIS functioning as support. The support system therefore had to be redesigned as support passed from CVIS to DISCOVER.

It took Tiedeman at least the last eight years to come to this realization. The realization was hastened by the opportunity he had to lead the designing of an Information System for Vocational Decisions (ISVD) from 1966-69. In designing the ISVD, Tiedeman and several colleagues undertook the quite difficult system and psychological problem of permitting personal monitoring gradually to be substituted for system monitoring in career development through comprehended decision making. Although this requirement eventually proved to be the financial rock on which the ISVD seemingly momentarily founders, the requirement also proved to be the logical rock on which Tiedeman builds a new evolutionary theory of self-initiated, self-directing, self-correcting learning. When you invariably insist that only each man can help himself -- i.e. that no other man can fully help another -- you begin clearing away the considerable garbage in which we surround guidance in education. A person must prove able to use a computer system by himself before he can be informed by the work of another while remaining free of the delusionary system in which the work of that other is set. For instance, in order to protect another person from enslaving himself in your delusional system, you must tell him what you know, tell him why you hold the beliefs that you do, but insist that only he can fully know, that you really don't fully know. This relationship of an inquirer to facts was maintained in the ISVD by insuring that each of the system's monitoring subsystems could eventually be reprogrammed by the inquirer to become his own monitoring subsystems. Inquirers were therefore bound to find that they could somewhat change the system's monitoring subsystems but that major changes involved higher-order system reprogramming which they wouldn't want to undertake. Inquirers therefore first gained the advantage of interacting with their personalized monitoring systems sufficiently to let themselves know what they were doing within system circumscription. They next realized that this knowledge sufficiently limited them unless there was a major reordering of the system in order to obtain interaction with the major new understandings which they sought. And attempting major system reordering eventually threw each inquirer back on the resources of his mind. Such inquirers thereby used the adjuvant gain which the original semi-autonomous computer-programming had permitted but attained the existential gain of their i+1 level comprehension within themselves, not in perpetual connection with the computer. This latter statement in no way precludes the possibility that a person may in the future reconnect with his former adjuvant system in order to re-exercise his old i-level understanding just prior to reprogramming it at his present i+1 level comprehension in preparation for achievement of an i+2 level restructuring of the i-1, i, and i+1 levels of yore.

Tiedeman achieved these realizations for himself by having to design an Information System for Vocational Decisions. The rigor of laying out an Information System for Vocational Decisions so that it would have the effects which Tiedeman and his colleagues prescribed is demanding and lengthy. As it became apparent to Tiedeman that research investment sources were not currently going to support the needed rigor and time, Tiedeman resorted to a form which his colleague Allan Ellis had taught him to use in specifying what a computer would have to do in order that it can be said to have counseled (Ellis and Tiedeman, 1970). In this form, you first seriously address the question, Can a machine X? You then admit that no machine will ever completely do man's more complicated X-ing. But what you seek is a form of substitution of machine functions for man functions in which you can say that the machine has the same result as a man does when either functions. You then avoid all possible traps in which you erroneously put man-like functions into the machine just because man has to function as he does to get his results. You next keep looking at the results you seek and design your machine to get those results, not to do man-like functions. You then ask yourself what the problems are which you face in X-ing and then try to design a machine which will cause an inquiring person coming into contact with it to have the X result. What happens each time that you do this is that you end up with the design of a machine which in interaction with an inquirer will supposedly have the effect specified.

Tiedeman took comprehension of his problem as the effect which was to be achieved by an inquirer in interaction with a machine as he then seriously addressed the following questions:

Can a machine counsel? (Ellis and Tiedeman, 1970)

Can a machine develop a career? (Tiedeman, 1972a)

Can a machine admit an applicant to continuing education? (Tiedeman, 1970)

Can a machine ground education in research? (Tiedeman, 1971)

Two things happened to Tiedeman in this process. First Tiedeman found himself specifying a theory of counseling (Ellis and Tiedeman, 1970), of career development (Tiedeman, 1972b), of measurement and decision in admissions (Tiedeman, 1970), and of the thought process in educational research (Tiedeman, 1971). Second, Tiedeman found himself personally poised for Clare Graves' (1974) momentous developmental leap, a leap from an experientialistic being existence grounded in cognitive existence into his unknown but now intuitively sensed systems being existence based in experience and thought.

McLuhan and Fiore (1967) clearly point out that mankind and his media are interdependent. Mankind makes his media but media fashions mankind as well.

So too with computers in guidance. The authors of this paper are living examples of this principle. Both have made computer systems in guidance but computer systems in guidance have somehow or other moved each to a higher level of personal existence as well. For Harris, this higher level has been a more interactive level of existence with comprehension of how the understanding of interaction frees one to base one's life in interaction. Tiedeman has recently quickly moved through Graves' being levels of cognitive and experientialistic living and is poised to exist at a new systems level. The hierarchical restructuring undergirding Tiedeman's latest saccadic jump is explicitly noted above. However, note that the list of questions about what a machine can do essentially progresses as follows:

Can a machine X?

Can a machine X a Y?

Can a machine X a Y in Z?

With John Peatling, Tiedeman is presently engaged in using this generalized understanding of how to achieve comprehension to prescribe how a machine can ground self in personality provided that the machine is designed ultimately to achieve comprehension of the problem as in all previous cases. The result is the draft of a new manuscript, "Designing Self: A Group Theory of Constructionist Personality Reconstruction." In this new manuscript Peatling and Tiedeman (1974) outline the design of an Information System for Life Decisions (ISLD) fashioned on its ancestor, the Information System for Vocational Decisions. What ISLD contains which ISVD lacked is a group theory of personality. John Peatling first refashioned such an elegant group theory out of the previous work and thought of Ernest Ligon (1970). Together, Peatling and Tiedeman then refashioned the revised Peatling group theory of personality into a group theory of constructionist personality reconstruction. The result is that the process, goal, structure, and substance of epigenesis are now more explicitly outlined than ever before to Tiedeman's knowledge. A group theory of constructionist personality reconstruction then ought to be integrated soon with Graves' theory of levels of existence to point a way in which mankind can move more certainly to a third being level in an open system of values, a systems existence grounded upon Graves' six subsistence levels, automatic, tribalistic, ego-centric, saintly, materialistic, and personalistic, and his two being levels, cognitive and experientialistic.

Men make machines. Machines in their turn somewhat fashion mankind. But in involving computers in guidance we can look forward to an era in which men make guidance machines while guidance machines in turn guide men toward full comprehension of how much a machine man really is.

These are heady possibilities. We urge that we press forward on an international front in providing computer-involved guidance systems so that we may together help mankind around the globe further mature to live as one people consisting of systems, existing in systems, but finding and living each being by transcending systems.

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EXHIBITS

EXHIBIT 1

BRIEF DESCRIPTIONS OF CURRENTLY EXISTING DOMINANT

COMPUTER-INVOLVED GUIDANCE SYSTEMS IN THE UNITED STATES

I. Direct Inquiry Systems without Monitoring

A. The Guidance Information System (GIS) is a commercial system which made use of some of the ideas employed in the Information System for Vocational Decisions. This system, currently marketed by Time Share Corporation and Houghton Mifflin, is a direct inquiry system without monitoring. It offers the user an interactive search of four data files by entering coded characteristics which are explained in the user manual. These files are all two and four-year colleges in the United States, specialized schools in some regions, occupations, and financial aids. The user receives both a list of options and descriptive information about each. Current cost of the system is 75¢ per fifteen-minute use, or $3.00 per hour. For further information, write to

Time Share Corporation
Hanover
New Hampshire

B. The Oregon Information Access System (OIAS) is a statewide system in Oregon. It is an interactive direct inquiry system without monitoring, operating on IBM and Hewlett Packard computers with typewriter terminals. The system has six components: a) QUEST, an on-line questionnaire which assists users to assess interests and abilities, leading to the identification of occupations in the data file which have the characteristics desired by the user, b) information about occupations selected by the user, including local manpower data, c) information about training opportunities within the state, d) bibliography of reference materials for further information, e) taped interviews with workers in each of the 230 occupations in the data file, and f) local persons who are willing to discuss their occupations with students. The system is costing approximately $2.00 per student hour of use.

II. Direct Inquiry Systems with System Monitoring

A. The Computerized Vocational Information System (CVIS), developed by JoAnn Harris and colleagues at Willowbrook High School in Villa Park, Illinois, makes use of an IBM 360 or 370 computer and cathode ray tubes. CVIS is a direct inquiry with monitoring system. The system has three distinct parts: the guidance system, the computer-assisted instruction system, and the administrative system. The guidance system has ten subsystems: vocational exploration at junior high level with associated visual materials; vocational exploration at secondary school level; four-year college information and search;

community college information and search; technical school information and search; apprenticeship information; military information; local job search; financial aids search; and student registration. The CVIS system is in public domain and has been broadly distributed; it is currently operational in 122 sites in the United States. Current cost per student hour at the terminal is $1.92. An active consortium of CVIS users maintains its data files and shares in new developments. Further information about the CVIS system can be obtained from:

Mr. Enzo Giuntoli
Willowbrook High School
1250 S. Ardmore
Villa Park, Illinois 60181

B. The Education and Career Exploration System (ECES) a direct inquiry system with monitoring, was originally developed by the IBM Corporation. It has been given to the State of Michigan and is operational in Genesee Intermediate School District in Flint, Michigan. New developments and modifications of the system are underway at the site of operation. ECES III, the latest version, makes use of a cathode ray tube terminal, a microfiche reader, and an IBM 360-50 machine. ECES provides four on-line components and one off-line component. The on-line ones are exploration of 400 occupations with job duty samples, exploration of 400 post-secondary majors, and teaching and practice of decision making. The off-line component is a batch-process search of educational institutions, including four-year colleges, two-year colleges, and technical-specialized schools. Further detailed information can be obtained from:

Mr. Alva Mallory
Genesee Intermediate School District
Flint, Michigan

C. The System for Interactive Guidance and Information (SIGI) is under development and field test at Educational Testing Service, in Princeton, New Jersey. This system, unlike the others described here, is specifically designed for community college students. The system offers four subsystems: a) Values, b) Information, c) Prediction, and d) Planning. The first describes 10 occupational values, assists the user to weight them, and identifies occupations which may fulfill the user's combination of them. The second subsystem provides information about occupations selected by the user; the third allows the user to receive predictive statements about probability of success in given courses or curricula related to his occupational choice. The fourth assists the user with specific step-by-step planning toward implementation of career choice. The system is designed to operate on a stand-alone PDP-11 minicomputer with multiple cathode ray tube terminals. Further detailed information can be obtained from:

Dr. Martin R. Katz
Educational Testing Service
Princeton, New Jersey

EXHIBIT 2

BRIEF DESCRIPTION OF THE MODULES BEING DESIGNED FOR THE SECONDARY SCHOOL COMPONENT OF DISCOVER

The user will enter this component through an entry module in which he will be identified, will receive instructions about how to use the system, will be introduced to the content of the modules, will review his last use of the system (if any), and will be guided to an appropriate beginning point. As in the Grade 4-6 component, the user may choose where he wishes to begin even if it is not in keeping with system recommendation. The modules of this component are as follows and will be suggested in the order listed here:

1A. <u>WHAT ARE MY VALUES?</u> (Value Clarification)

This module contains a number of experiences which lead the user to think about what a value is, to analyze his own set of values, and to decide upon actions which implement those values. The last part of the module proposes ten values related to occupations, based on the research of Dr. Martin Katz of Educational Testing Service. The student rates the importance of each of these ten values to him and may then ask the computer to search its data file for occupations which can provide the combination and weighting of the values assigned by the user. The summary of work values is retained for later use in the system.

1B. <u>HOW CAN I MAKE A DECISION?</u> (How To Make a Decision)

This module assists the user to become aware of various kinds of decision-making styles. The Planful Decider process is taught, and a variety of exercises are posed for practicing the steps of planful decision making.

1C. <u>HOW ARE OCCUPATIONS CLASSIFIED?</u> (Classification Systems)

This module presents the world of work by way of two organizing principles: the data-people-things division used in the <u>Dictionary of Occupational Titles</u>, and Holland's six groups. A number of exercises are presented to give the student practice at using these classification systems; the student's responses are monitored for the purpose of providing more instruction if needed.

2A. <u>PRACTICING DECISION MAKING</u>

This module allows the user to construct a decider in the age ranges of 15-20, 20-30, or 30-40 and select the types of problems with which he wishes his decider to deal. Then problems are posed which are typical of the age range selected by the user, and the system monitors the process by which the user makes a decision about the resolution of these problems.

2B. CAREER DECISION GAME

This module is a monopoly-like game designed by the DISCOVER team which may be played by one or two players. In the beginning of the game, the student is introduced to the concept of weighting values. He is invited to place relative weight on three possible goals: income, recognition, and happiness. Winning his career decision game consists of reaching the number of points under each of these three categories to the degree at which he said they were important to him. The game is played by the user by moving forward on a board based on the random "throwing of the die" by the computer. The spaces on which the user lands may provide him with an opportunity to make decisions about choice of occupation, educational options, use of leisure time, or life style. On the other hand, they may subject him to some of life's events, such as unexpected setbacks, unexpected opportunities, and payment of necessities such as housing, clothing, and transportation. The user may also acquire plan cards which allow him to have more control over his life than the computer's rolling of the die affords. The way in which decisions are made on the "decide" squares may add points toward the values for which the players are playing the game. The game ends when the player has received the score which he has set for himself under the categories of income, recognition, and happiness.

2C. BROWSING OCCUPATIONS

This module makes use of the Holland classification system presented in Module 1C, as an organizational structure by which the user can browse the world of work. The module allows him to touch any point of the Holland hexagon and to be presented with a list of occupations which fall in that particular segment of the circular world of work. The user may select titles from the list and ask for related occupational titles, work duties and activities.

3. WHAT ARE MY INTERESTS AND COMPETENCIES? (Self-Exploration)

This module is John Holland's Self-Directed-Search administered and scored on-line. This instrument is a self-report of the user's career-related interests, experiences, and competencies. These data, collected via the items on the instrument, result in a three-letter code, which is a summary of the user's vocational personality. This code and its meanings are carefully explained to the user.

4. MAKING A LIST OF OCCUPATIONAL ALTERNATIVES (List of Occupations)

This module provides the user with a list of occupations which appear to be consistent with the vocational personality indicated by the three-letter code explained in the previous module. The computer searches its data file to produce lists of occupations which have relative degrees of consistency with the student's code, based upon Holland's theory of vocational choice and his Occupations Finder.

5. COLLECTING INFORMATION ABOUT MYSELF AND OCCUPATIONS (Trying on a Job)

This module allows the user to get a great deal of information about the occupations on his list. In a series of displays, some making use of visual materials, the user may receive information about job duties, benefits and limitations, educational requirements, future outlook, related careers and additional sources of information. The user also has the capability to review his own student record (record of grades in related courses, related work or course experience, present rank in class, etc.) against the requirements of the job or of its prerequisite training. The module also allows the capability to compare two or more occupations by calling in data about both or several simultaneously. The user leaves this module with a list of occupations in which he has serious interest. This list may be a shortened form of the list with which he entered the module or may be a new list which he has generated by searching the occupational data file by the combination of a variety of characteristics of jobs.

6. EVALUATING AND NARROWING CAREER ALTERNATIVES (Personal Career Decision Making)

The user enters this module with the list of occupations from the previous module or with a new one which he generates at the beginning of this module by selecting job titles from a list or by searching the data file by a combination of characteristics. The purpose of this module is to assist the user to narrow the list further so that he leaves the module with a first-choice occupation in mind and a limited number of others in priority order. This narrowing is assisted by the capability to ask for additional information about any occupations on the list, to compare information about two or more occupations, and by analyzing the remaining occupations in light of the work values identified ~~in 1A or here if not done previously.~~ Finally, the user is asked to remove occupations which are no longer of interest and to put the others in priority order. The user leaves the module with a top-priority selection.

7. MAKING A SPECIFIC CAREER PLAN (Career Planning)

The user enters this module with one specific occupation in mind for which he wishes to implement a career plan. The module takes him through four specific steps. The first is choosing the plan of entry into the occupation. For some occupations there may be only one road, such as four-year college; for others, there are several roads, such as on-the-job training, community college technical programs, private vocational schools, or the military. The second is a look at the courses in high school which may best facilitate this plan. From this point, the user might branch to "Request-A-Course" which allows him to register for the following semester, year or quarter. The third step is a look at role testing experiences which the student has had in relation to this occupation such as part-time jobs or participation in related extra-curricular activities, and the recommendation of others if his experience seems to be inadequate. The fourth step is the choice of a specific place or institution in which to implement the vocational choice or to get the training for it, i.e., the choice of a local company, technical school, community college, continuing education program, college, military program, or apprenticeship. Planning may also involve finding appropriate local funds, grants, or scholarships. The completion of the fourth step involves very sophisticated searches and interaction with nine large data files. These same data files are used for the counselor support system. The user may enter this module and go directly to any of these search programs or recall information about any of the schools or programs in the file without going through the complete module.