ABSTRACT
                  The Career Planning System (CPS), a highly structured
microcomputer package designed to provide middle school age mildly
handicapped students with individualized career exploration and
career planning experiences, is described. Development of the
system's three components (30 floppy disks, a student guide, and an
instructor guide) and field testing with learning disabled, mildly
retarded, and severely behavior disordered students are traced. The
system is explained to draw on the student's own interests and is
pointed toward four major career development outcomes: learning about
personal interests, examining occupations, identifying activities in
which personal interests may be nurtured, and relating educational
preparation to potential occupational choices. Ten interest areas are
presented (representative occupations in parentheses): advising
(child care attendant, lawyer); arranging (architect, hair stylist);
building and making (roofing, painter); doing clerical work (cashier,
file clerk); helping (police officer, waiter); maintaining and
repairing (mechanic, plumber); thinking in pictures (cartoonist,
photographer); using environmental information (farmer, landscape
gardener); working with equipment (cook, telephone operator); and
working with numbers and symbols (library assistant, teller). Step by
step progression through the CPS is described in which students
investigate activities and "interview" workers. An education plan
provision of the system allows student and teacher to plan for future
learning in the occupation of interest. A management component that
enables the teacher to monitor the individualized lessons is
described. (CL)

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CAREER PLANNING MEETS THE MICRO:
A DEMONSTRATION

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The <u>Career Planning System</u> (CPS), Microcomputer Version, is
a comprehensive, highly structured instructional package designed
to provide individualized career-exploration and career-planning
experiences for mildly handicapped students of approximately
middle-school age. Developed specifically to take advantage of
the motivational, managerial, and interactive capabilities of the
Atari 800 microcomputer system (console, monitor, and two disk
drives) with 48K of memory, the CPS is intended to serve students
with mild mental retardation, learning disabilities, and severe
behavior handicaps who are capable of reading at the 3.5 grade
level. Field tested with such students at five school districts
within or adjacent to major population centers in Colorado,
Missouri, New York, Ohio, and Texas, the CPS has been found to
engender a significant increase (at the .05 level) in students'
overall knowledge about careers, about themselves with respect
to careers and career planning, and about career planning in
general.

A combined staff of instructional designers and computer
programmers at the National Center for Research in Vocational
Education, The Ohio State University, worked under an eighteen-
month grant from the U.S. Department of Education to develop, test,
and revise the CPS materials and to initiate a plan for their
dissemination. The final instructional package prepared through
this effort consists of three components:

- <u>Thirty floppy disks</u>--the core of the CPS--that provide
  (1) an interactive instructional component that is
  the main vehicle for student progress through the

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forty occupations represented in the CPS and (2) a
comprehensive management system with a variety of
instructor options for monitoring student progress
throughout the instructional materials;

- A Student Guide for each student that provides rein-
forcement for student learning, a permanent record
of the student's experiences with the CPS, and a
means for expansion and discussion of those experi-
ences; and

- An Instructor Guide that provides the theoretical,
technical, and instructional information a teacher
or counselor needs to implement the CPS.

Arrangements are currently underway to have the materials marketed
and distributed by a commercial agency. At present, it is
assumed that the complete package will be available in the Fall
of 1983. The National Center's Program Information Office is
maintaining a file of requests about availability that will be
answered as soon as this information is official.

Each of the components of the CPS was developed in accordance
with a set of minutely detailed specifications compiled by project
staff early in the conduct of the work effort. These specifications--
which cover both the computerized and the printed CPS materials as
well as their interrelationships--were developed to ensure that the
final materials truly meet the needs of the target population and
their teachers. Thus, the specifications detail not only the
content of all the pieces but the particular format of each--for
example, the layout of each type of computerized display to ensure

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that it presents information in a direct, consistent, and visually appealing manner that will enhance the possibilities for student learning. A particularly significant segment of the specifications deals with instructional and technical considerations related to the needs of mildly handicapped learners. This segment addresses such issues as the presentation of objectives, the appropriate development of concepts, various aspects of reading level and language style, the use of sensitive and effectively presented feedback, the provision of aids to the transfer of learning and generalization of knowledge, appropriate student-computer interaction, selected types of individualization, the use of sound and graphics, and the encouragement of learner independence.

The Instructional Materials

Through the CPS, students become acquainted with a variety of occupations that are representative of basic worker functions. The key to the System is the students' own interests--not in occupations themselves but in activities the students presently enjoy, either in school or during leisure time. The final intended outcome is students' insightful participation in planning their studies and activities for the future. This goal must, of course, be an outgrowth of development in other areas--in self-understanding; in problem-solving, decision-making, and planning skills; and in increasing knowledge of occupations, their inter-relationships, and their relationship to the individual. Therefore, the CPS materials are designed to help students achieve four major career-development outcomes:

- To learn about personal interests,
- To examine occupations to learn how they may relate to personal interests,
- To identify activities and areas of study in which personal interests may be nurtured and in which related skills may be developed, and
- To relate educational preparation to potential occupational choices.

The organization of the CPS reflects the System's emphasis on these goals. As noted in Figure 1, "Career Planning System Overview" the student begins to proceed through the instructional materials at the level of personal interests and progresses through a wide variety of experiences before he or she is asked to consider various factors in relation to educational and career planning.

After reading in the Student Guide a brief "Welcome" statement and an illustrated list of the six steps involved in loading a disk into a disk drive, the student signs on to the computer by typing his or her first name and personal CPS code number. The student is then routed automatically through each of the System's four major components in turn--Introduction, Interest Sort, Interest Areas, and Education Plan. The Instructor Guide provides a detailed description of each of these components and of the procedures the teacher and students should follow in relation to them.

1. Introduction

The Introduction includes an explanation of the general content and structure of the CPS and of the objectives students should

FIGURE 1

CAREER PLANNING SYSTEM OVERVIEW

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                    ┌─────────────────┐
                    │  INTRODUCTION   │
                    └────────┬────────┘
                             │
                             ▼
                    ┌─────────────────┐
                    │    INTEREST     │
                    │      SORT       │
                    └────────┬────────┘
                             │
   ┌─────────────────────────▼──────────────────────────────────┐
   │                     INTEREST AREAS                          │
   │                                                             │
   │ ┌─────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────┐ │
   │ │ ADVISING│ │ARRANGING │ │ BUILDING │ │  DOING   │ │HELPING│ │
   │ │         │ │          │ │   AND    │ │ CLERICAL │ │       │ │
   │ │         │ │          │ │  MAKING  │ │   WORK   │ │       │ │
   │ └─────────┘ └──────────┘ └──────────┘ └──────────┘ └──────┘ │
   │                                                             │
   │ ┌──────────┐┌──────────┐┌────────────┐┌───────────┐┌──────┐ │
   │ │MAINTAINING││ THINKING ││   USING    ││WORKING WITH││WORKING│ │
   │ │   AND    ││    IN    ││ENVIRONMENTAL││ EQUIPMENT ││ WITH  │ │
   │ │REPAIRING ││ PICTURES ││INFORMATION ││           ││NUMBERS│ │
   │ │          ││          ││            ││           ││AND SYMBOLS│
   │ └──────────┘└──────────┘└────────────┘└───────────┘└──────┘ │
   └─────────────────────────┬──────────────────────────────────┘
                             │
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                    ┌─────────────────┐
                    │   EDUCATION     │
                    │     PLAN        │
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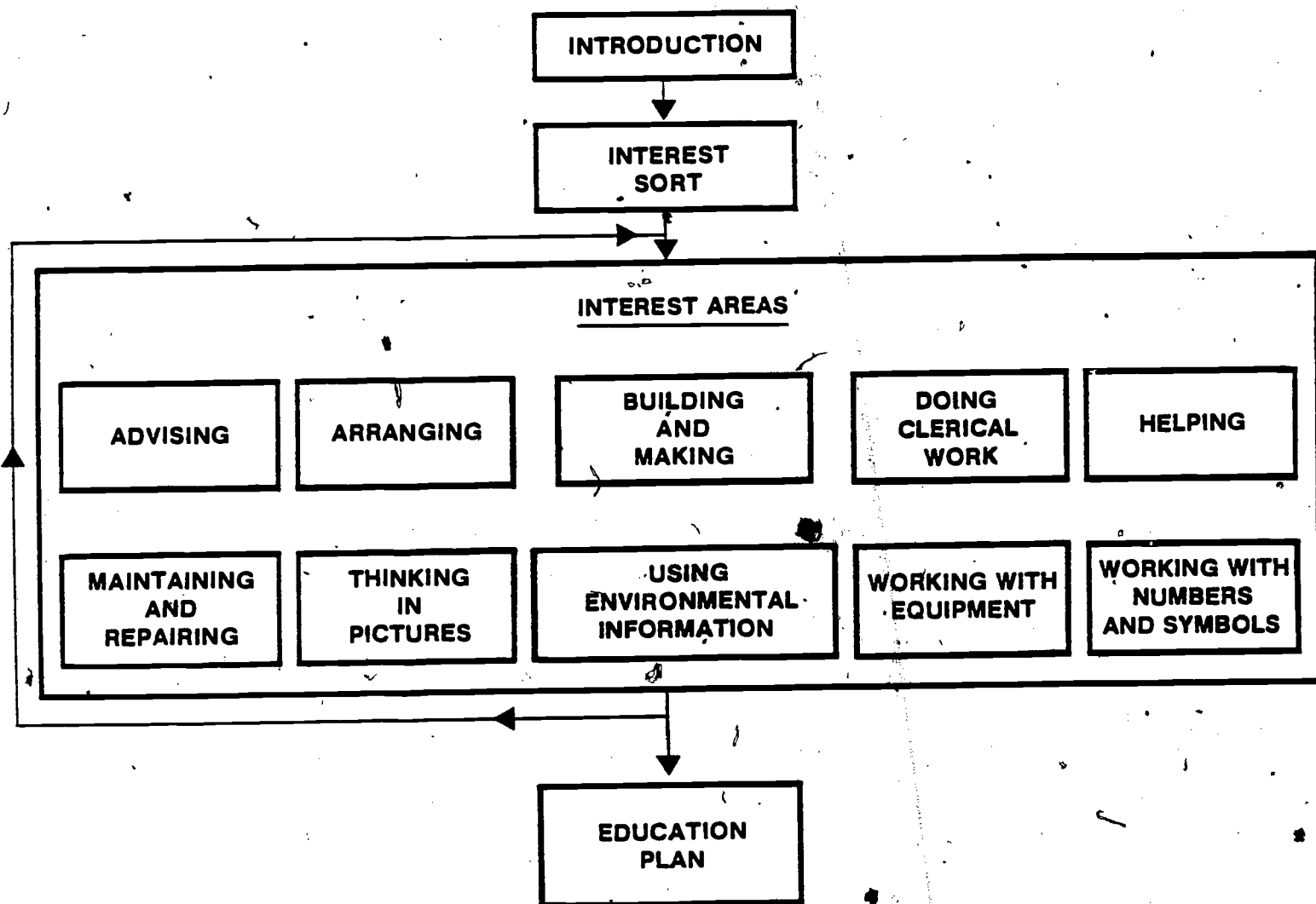
achieve through using it; a variety of vocabulary-building activi-
ties--for example, word-search and crossword puzzles--related to
terms essential to the CPS; and general instructions on how to
use the CPS. Student understanding of this information is rein-
forced through a series of exercises in the Student Guide designed
to complement the computer based activities. The Student Guide
also contains an illustrated glossary of supplementary vocabulary
words about occupations ("goods," "services," etc.) and about
educational preparation ("college," "apprenticeship," etc.) that
students will encounter later in the CPS but will not need in the
early stages. This glossary was included in the Guide to provide
students access to important terms they may not know without
overloading the computerized Introduction with vocabulary that
will not be used for a long time.

   2. Interest Sort

   This key component of the System is comprised of fifty
general questions related to the ten CPS Interest Areas. Designed
to help students identify interests in a variety of work related
environments and activities--for example, working outdoors, helping
people with their problems, etc.--the Interest Sort provides the
basis for each student's individualized movement through the rest
of the CPS package. After the student responds A, B, or C to
each statement according to his or her degree of interest in it--
A. A lot, B. A little, or C. None at all--the CPS's computerized
management system automatically sorts and compiles the answers
into an ordered listing of the student's Interest Areas. When the
student's list appears on the display, he or she is instructed to

copy the list into the Student Guide for reference. From this point on, each time the student signs on to the computer to use the CPS, he or she will be taken through the System automatically on the basis of this list.

3. Interest Areas

The ten CPS Interest Areas are the heart of the Career Planning System. Developed around general areas that middle-school students might have or wish to explore rather than selected from traditional occupational clustering systems, the Interest Areas are designed to help students deal with immediate self-knowledge rather than with abstract speculation about the future. Each Interest Area is built around four occupations chosen to cover an educational continuum from high school diploma to graduate degree; a range of skills from entry level to professional; and an array of visual, verbal, and computational abilities. Figure 2, "CPS Interest Areas and Occupations," displays the titles of the ten Interest Areas and the names of the four occupations covered in each.

Figure 3, "Interest Area Flowchart," indicates the way in which a student moves through each Interest Area that he or she elects to explore. First, the student reads a Probe--which provides a brief description of the Interest Area and presents ten statements related to the Area's activities. The student responds "yes" or "no" to these statements, which are designed to help him or her consider whether personal interests, abilities, and skills match those that are typically found among workers in the Interest Area.

FIGURE 2

CPS INTEREST AREAS AND OCCUPATIONS

1. Advising

    Child care attendant
    Employment counselor
    Lawyer
    Travel agent

2. Arranging

    Architect
    Florist
    Hair stylist
    Interior designer

3. Building and Making

    Carpenter
    Drafter
    Painter
    Roofer

4. Doing Clerical Work

    Cashier
    File clerk
    Secretary
    Stock clerk

5. Helping

    Licensed practical nurse
    Police officer
    Properties manager
    Waiter

6. Maintaining and Repairing

    Appliance repairer
    Mechanic
    Plumber
    Sanitation worker

7. Thinking in Pictures

    Cartoonist
    Commercial artist
    Display artist
    Photographer

8. Using Environmental Information

    Farmer
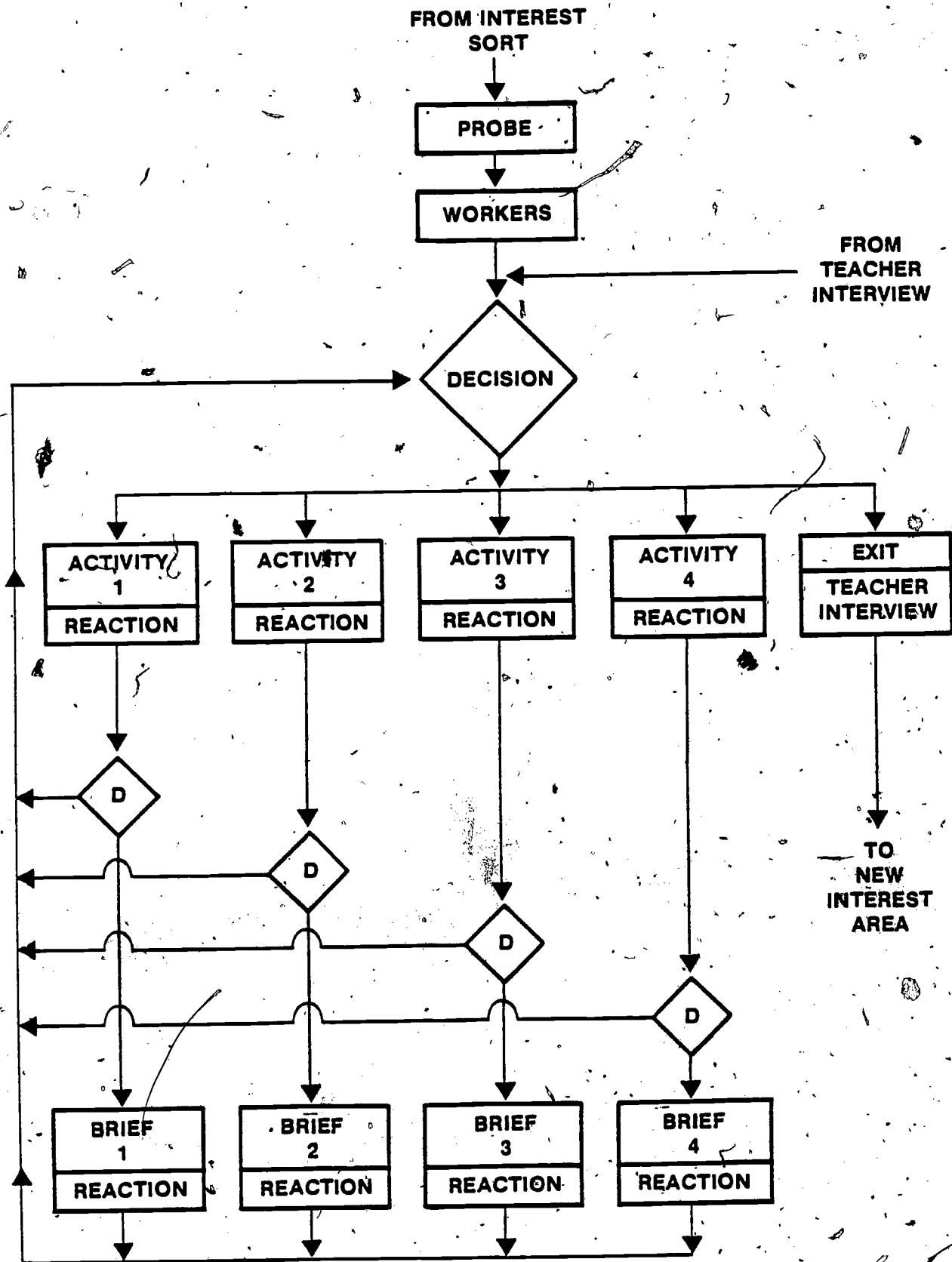   Fish and game warden
    Landscape gardener
    Meteorologist

9. Working with Equipment

    Computer service technician
    Cook
    Machinist
    Telephone operator

10. Working with Numbers and Symbols

    Library assistant
    Market research coder
    Medical laboratory assistant
    Teller

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FIGURE 3

INTEREST AREA FLOWCHART

FROM INTEREST
SORT

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PROBE

WORKERS
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FROM
TEACHER
INTERVIEW

DECISION

ACTIVITY 1	ACTIVITY 2	ACTIVITY 3	ACTIVITY 4	EXIT
REACTION	REACTION	REACTION	REACTION	TEACHER INTERVIEW

D

D

D

D

TO
NEW
INTEREST
AREA

BRIEF 1	BRIEF 2	BRIEF 3	BRIEF 4
REACTION	REACTION	REACTION	REACTION

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Next, the student meets four imaginary workers representative of the occupations included in the Interest Area. These workers--for example, Jimmy Wolinski (painter), Cynthia Sakuma (architect), Clark Hampson (file clerk), Barbara MacIntosh (auto mechanic)--explain a little about their job tasks as simulated in the CPS Activities in order to enable the student to choose one or more of these Activities to explore.

The student next decides which of four Activities to complete as the first step in exploring a particular career. Across the CPS, the Activities cover a wide range of tasks: the visual problem identification of the landscape gardener, the computation of the waiter, the form completion of the employment counselor, and so on. Designed to give students a "feel" for the occupations they represent, the Activities are highly interactive and make sustained and persistent use of a variety of strategies (graphics, sound, joysticks, gamelike sequences, etc.) both for motivating students and for encouraging their active involvement with and deep cognitive processing of the information that is presented.

Each Activity takes approximately twenty to thirty minutes to complete, offers a list of additional activities (external to the CPS) that a student might try in order to expand his or her exploration of the occupation, and concludes with a Reaction Form designed to provide an opportunity for the student to record personal perceptions of the Activity. The computer stores the student's responses to the two questions on this Form--"How much did you like this Activity?" and "How well did you do in this Activity?"--and later uses these as well as other student responses

to compile an individualized list of up to ten CPS jobs that are of greatest interest to the student. The student is also instructed to fill out a complementary Reaction Form in the Student Guide that encourages him or her to expand upon the computerized responses and the reasons for them.

At this point the student encounters another decision—whether to read an occupational Brief about the job just explored in the Activity; to explore another Activity in the Interest Area; or to leave the Interest Area to go to another one or, if appropriate, to proceed to the Education Plan component of the CPS.

The CPS includes forty menu-driven occupational Briefs, one for each Activity. The Briefs follow a consistent format to provide sketches of the kinds of information the student should consider when making career choices—additional job tasks, the work environment, educational preparation, salary range, and so on.

To complete a Brief, the student "interviews" the worker whose comments earlier in the Interest Area first sent him or her to the occupational Activity: the student meets the worker again, reads a few displays in which the worker gives some basic information about the occupation, and then selects any four (or more) of six questions to "ask" the worker. The student may ask those questions in any order and is returned to the menu of questions after each answer for his or her next selection; a computerized counting routine keeps track of the questions the student asks in order to ensure that questions are not repeated and to allow

the student the option of skipping either one or two questions
and continuing with the next section of the Brief.

The answers to five of the six questions are given in con-
versational, first-person narratives by the worker the student
is interviewing. The answer to the sixth question--"How can I
become a(n) (occupation title)?"--is a list of high-school courses
to take, in- and out-of-school activities to pursue now, and
things to do after high school to enter the occupation. The
student is instructed to copy this information into the "Career
Plan" section of the Student Guide for use in the culminating
component of the CPS, the development of the Education Plan.
Finally, the student completes a two-part Reaction Form: (1) a
computerized part that stores answers to two questions--"Would
you like to do the kind of work you learned about in the Brief?"
and "Could you learn to do good work in this job?"--to use in
compiling the list of student preferred jobs described earlier
and (2) a complementary Student Guide part designed to help the
student expand upon the reasons for his or her computerized
responses.

A student can explore as much or as little of each Interest
Area as he or she desires. As Figure 3 shows, a student can
leave an Area after reading the Probe and meeting the workers,
after completing any Activity, or after completing any Brief.
Thus, a student can leave an Interest Area if none of the jobs
seems appealing or can remain in it to complete one or more
Activities and, if desired, their accompanying Briefs. Each
time a student decides to leave an Interest Area, he or she is

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directed to participate in an "Exit Interview" designed to assist
the teacher in facilitating the student's experiences with the
CPS. During this interview, the teacher is to help the student
explore personal feelings about the Interest Area and, if he or
she has left it after only minimal exposure, the reasons for
that decision. Since it is important for the student to maintain
control over the experience, the interview should be supportive
rather than directive. If appropriate, the discussion might be
based on the Reaction Forms completed by the student during work
in the Interest Area.

Although the CPS is essentially an individualized, self-paced
instructional package that focuses on growth in self-awareness
rather than on interpersonal concerns, students should come to
recognize that growth comes through interaction with others as
well as through solitary reflection. To encourage this recogni-
tion, the Instructor Guide includes a number of suggestions for
discussions, games, and other activities that the teacher and
pairs or other small groups of students can use to enhance
personal growth. These supplementary activities are related
to career planning and decision-making in general and to topics
related specifically to particular CPS Interest Areas. They are
not mandatory but are to be used at the discretion of the teacher--
for example, with students who have finished several Interest
Areas and might profit from discussing their experiences with one
another. The Instructor Guide also lists sources and references
that teachers and counselors can use to provide additional occupa-
tional information to students who request it.

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4. Education Plan

Developing plans for further examination of and preparation
for occupations of interest is the culmination of the student's
work with the Career Planning System. Once the student has com-
pleted all the CPS Activities and Briefs of interest, he or she--
in conference with the teacher or counselor--designs a plan for
further exploration that incorporates the self-knowledge gained
from the CPS experience. The student begins this effort with a
computerized component that presents some brief introductory
information and then compiles the student's responses on all his
or her computerized Reaction Forms into a ranked list of as many
as ten CPS jobs in which the student indicated the greatest
amount of interest. The student copies this list into the Student
Guide and then takes the Guide to the teacher or counselor to
serve as the basis for a joint planning session in which the
student and the adult together develop a plan for the student to
follow to learn more about each occupation of interest.

The two-person planning team follows a standard procedure
to develop plans related to as many of the student's preferred
occupations as seems appropriate. Starting with the job at the
top of the list, the team reviews the relevant Reaction Forms and
Career Plan pages contained in the Student Guide. This material,
supplemented by the teacher's or counselor's knowledge of the stu-
dent and the student's own increased self- and career knowledge,
enables the team to answer the eight questions on the Education
Plan pages in the Guide. These questions, which address such
issues as the skills and training required for the occupation

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and the traditional and nontraditional ways for acquiring these,
are designed to focus the student's planning efforts and to provide
initial suggestions for implementing early career-planning decisions.
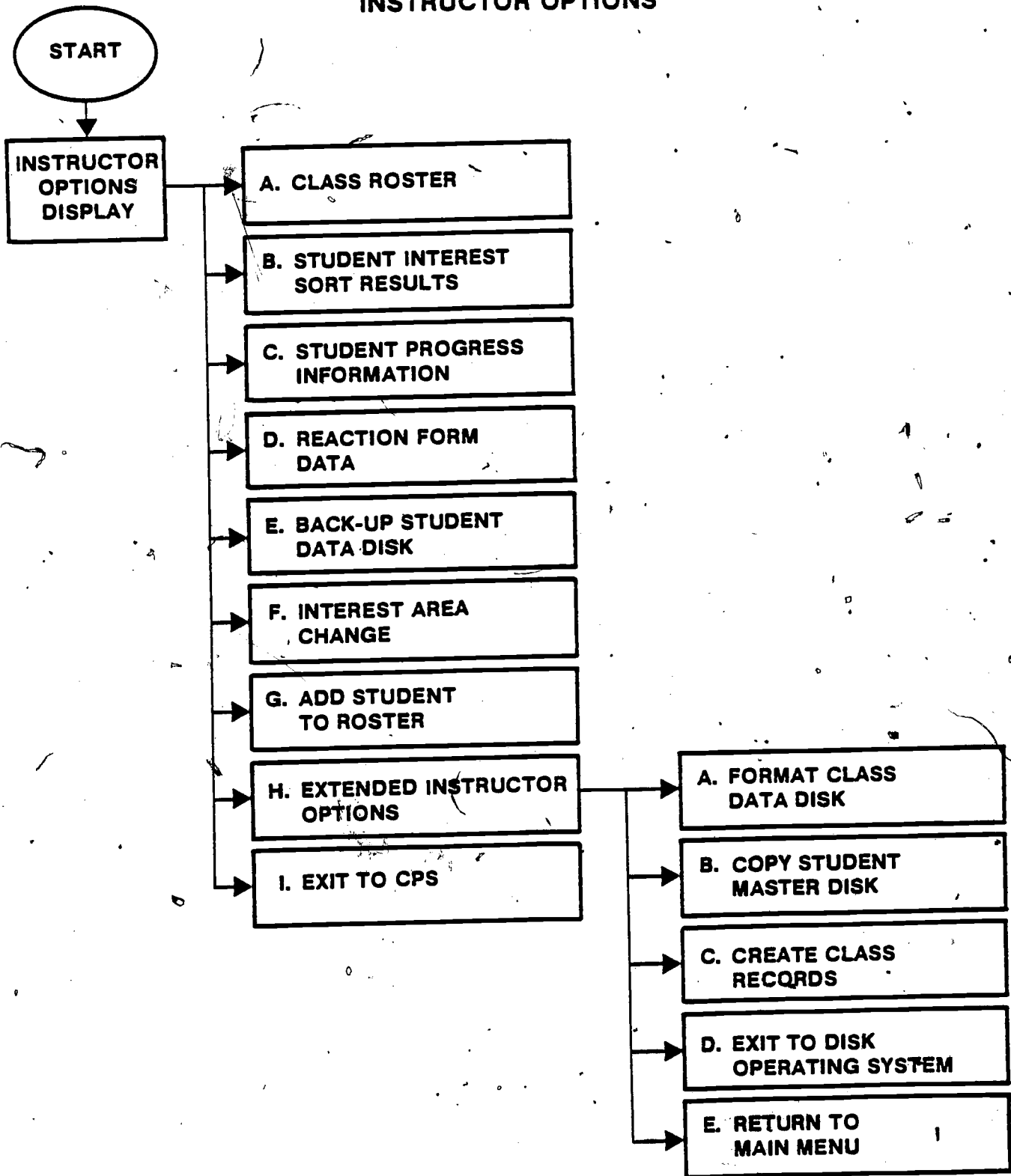
Although the completion of the Education Plan component of
the Career Planning System constitutes the completion of the CPS
itself, the student's career exploration and planning efforts should
obviously not terminate at this point. Once a student has com-
pleted one or more plans, he or she should select one (if necessary)
and--with the teacher's or counselor's assistance as necessary
and practical--begin to implement it. In addition, the student
can repeat his or her work with the CPS one or more times--gaining
something more from each experience as self- and career knowledge
and sophistication in career planning increase.

The Management System

. Designed to simplify the teacher's task of monitoring and
facilitating each student's progress through the Career Planning
System, the CPS management component is a thorough and sophisti-
cated mechanism that does all the student record keeping required
by the CPS instructional component and offers a number of addi-
tional options as well. As displayed in Figure 4, "Instructor
Options," the management system offers two menus of functions to
be used in concert with the CPS.

. To begin working with the System, the teacher chooses function
H on the "main menu" to get to the "extended instructor options"
menu--a list of functions the teacher uses only once to initiate
work on the CPS and can then ignore for the remainder of the
experience. Essentially, these functions enable the teacher to

FIGURE 4

INSTRUCTOR OPTIONS

START

INSTRUCTOR
OPTIONS
DISPLAY

A. CLASS ROSTER

B. STUDENT INTEREST
SORT RESULTS

C. STUDENT PROGRESS
INFORMATION

D. REACTION FORM
DATA

E. BACK-UP STUDENT
DATA DISK

F. INTEREST AREA
CHANGE

G. ADD STUDENT
TO ROSTER

H. EXTENDED INSTRUCTOR
OPTIONS

I. EXIT TO CPS

A. FORMAT CLASS
DATA DISK

B. COPY STUDENT
MASTER DISK

C. CREATE CLASS
RECORDS

D. EXIT TO DISK
OPERATING SYSTEM

E. RETURN TO
MAIN MENU

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prepare disks to accept and store the data that both determine each student's progress through the CPS and allow the teacher to track that progress. By following carefully detailed instructions that appear in the Instructor Guide and on individual computer displays, the teacher uses these options (1) to create the computer files that will store the students' individualized records and (2) to format and copy back-up disks as insurance in case the original record disks are lost or destroyed. Each record disk can hold complete files for up to twelve students, and the teacher establishes these files simply by typing each student's first and last names and a three-digit number between 100 and 998. This number becomes the student's CPS code number--the number that the computer uses to store the student's records and route him or her automatically through the CPS and that the teacher uses to gain access to the student's stored records. These records are protected from unauthorized access by the use of a special instructor code word that must be entered on the computer to activate the management system.

The seven instructor options on the main menu (i.e., all but the two included to provide access to the "extended options" menu and to the instructional component itself) comprise the set of functions the teacher will use throughout the students' CPS experience. The first of these--"Class Roster"--results from the creation of the class records and provides a list of the first and last names and (as a reference for the teacher) of the CPS code numbers of all the students working on the CPS. The second option--"Student Interest Sort Results"--enables the

teacher to see, on a student-by-student basis, the student's name, the Interest Area in which he or she is currently working, and the list of all his or her identified Interest Areas in order of preference as computed during the Interest Sort. The third option--"Student Progress Information"--shows the linear progress of any student through the CPS by listing, in order as completed, all the Probes, Activities, and Briefs the student has finished. The fourth option--"Reaction Form Data"--provides a summary of any student's answers to the questions on the computerized Reaction Forms for all the Activities and Briefs explored.

The final three options on this menu are concerned more with instructional management than with tracking student progress. "Back-up Student Data Disk," for example, should be used at the end of each day's work in order to keep a current back-up record of students' progress in case the original record becomes unavailable. "Interest Area Change"--a function that allows the teacher to interrupt the normal flow of the CPS when he or she determines that such an interruption is in the best interests of a student--enables the student either to explore an Interest Area that was not indicated by his or her original Interest Sort or to return to an Interest Area that he or she had previously completed. And "Add Student to Roster" allows the teacher to create computer files on an existing record disk for any students who begin their work on the CPS after the roster for the rest of the class has been created.

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Conclusion

Taken together, the instructional and management components of the Career Planning System, Microcomputer Version, provide a comprehensive, well-integrated, thoroughly documented, and thoroughly tested instructional package for learning disabled, mildly mentally retarded, and severely behaviorally handicapped middle-school students. Designed to capitalize on the motivational and managerial capabilities of one of the most exciting and powerful innovations in the history of instructional technology, this courseware package holds special progress for helping exceptional students make sound, well-informed career decisions that will ease their transition from school to jobs and, ultimately, enable them to achieve their right to full participation in the American work force.

For further information, please contact

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