DOCUMENT RESUME

ED 052 161 24 SP 005 047

TITLE	RFP 70-12: A Design of New Patterns To Train Research, Development, Demonstration/Dissemination, and Evaluation Personnel in Education. Vol. 1: Design of the Training Program. Final Report.
INSTITUTION	Southwest Educational Development Lab., Austin, Tex.
SPONS AGENCY	National Center for Educational Research and Development (DHEW/CE), Washington, D.C.
BUREAU NO	BR-0-9033
PUB DATE	18 Dec 70
NOTE	100p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	Consortia, *Educational Development, *Educational Research, Individualized Instruction, Internship Programs, *Personnel Needs, *Program Development, *Research and Development Centers, Training Techniques

ABSTRACT

In May 1970, USOE requested new training designs for research, development, diffusion, and evaluation personnel in education, and a consortium of interviews conducted on a nationwide basis in 21 selected institutions engaged in one or more of these activities, and the results confirmed extensive national and regional needs for trained RDD&E personnel. A review of the literature revealed a high demand but limited supply of competent personnel in the following skill areas: conceptualizing issues and processes; designing techniques; setting objectives; measuring and evaluating outcomes; implementing outcomes; and identifying and incorporating attitudes, values, and practices of minority groups. A systems approach utilizing individualized instruction was selected as the best method of training with modularized packages of material stressing the conceptualization of specific skills and a structured internship experience supervised by the training agencies. The development of this training system would take 4 years. In the first year the modular packages would be designed and tested, in the second year packages would be combined into subsystems and used to train individuals, in the third year the entire system would be tested as a whole unit, and in the fourth year the system would be installed at various agencies throughout the nation. [SP 005 048 and 005 049 are related documents.] (MBM)

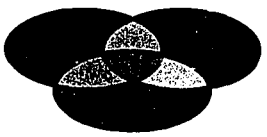
RFP 70-12: A DESIGN OF NEW PATTERNS TO TRAIN RESEARCH, DEVELOPMENT, DEMONSTRATION/DISSEMINATION EVALUATION PERSONNEL IN EDUCATION

FINAL REPORT

Volume 1

Design of the Training Program

December 18, 1970
Southwest Educational Development Laboratory
Austin, Texas



SOUTHWEST EDUCATIONAL DEVELOPMENT LABORATORY
800 BRAZOS STREET, AUSTIN, TEXAS 78701 – 512 476-6861

December 15, 1970

Dr. John Egermeier
Chief - Reseach Training Branch
National Center for Educational Research
and Development
Room 3051
400 Maryland Avenue, S.W.
Washington, D. C. 20202

Dear Dr. Egermeier:

Submitted herewith is a proposal to develop and implement a training system which will fill identified national personnel needs for educational research, development, demonstration/diffusion, and evaluation. Presented in three volumes, this proposal and final report of the planning phase includes Design of the Training Program (Vol. 1), Scope and Developmental Process of the Training Program (Vol. II), and Budget-Cost Analysis for Training Program (Vol. III).

The first volume contains a comprehensive summary of the activities of the training consortium led by the Southwest Educational Development Laboratory and a review of a national needs survey conducted by the consortium to determine training priorities. It also contains a description of a proposed training system to fill identified national needs.

Volume II outlines the consortium's plans for designing training modules, pilot testing them, and utilizing them. Volume III contains a statement of the cost of developing the proposed training program.

The delivery of this report on this date concludes the first phase of this project. The consortium members during this initial phase have demonstrated their ability to work together productively. This cooperative framework will continue to be an asset in the implementation of this proposal.

Very sincerely,

Edwin Hindsman

Edwin Hindsman
Executive Director

EH:ap

BRIEFING SUMMARY

New Design for Training

Prime contractor for operational phase:

Southwest Educational Development Laboratory

Project director for operational phase:

Dr. Walter F. Stenning
Director of Training Systems Design

Principal participants in operational phase:

Institutions	Individuals
1. Southwest Educational Development Laboratory	Dr. Walter F. Stenning
2. Texas Education Agency	Dr. Harlan Ford
3. University of Texas College of Education	Dr. Jackson B. Reid
4. Research and Development Center for Teacher Education	Dr. Oliver H. Bown
5. Educational Development Corporation	Dr. Dorothy A. Fruchter
6. Education Service Center Region XIII	Dr. Milton L. Smith
7. Austin Independent School District	Mr. Marshel Ashley
8. Louisiana State University College of Education	Dr. Fred Smith
9. Arizona State University	Dr. Michal Clark
10. Brigham Young University Department of Instructional Research and Development	Dr. M. David Merrill
11. Human Development Institute, Inc. Bell and Howell - Behavioral Science	Dr. Stephen Friedlander
12. Santa Clara County Office of Education Center for Planning and Evaluation	Dr. Frederick Long Dr. Thomas Owens Dr. Stephen Schwimmer Dr. Richard A. Gustafson
13. Pennsylvania State Department of Education	Dr. Paul Campbell
14. United States Research and Development Corporation	Dr. Frederick Haddad

Major manpower needs being addressed: The proposed training system is designed to train educational research and research-related personnel in four essential functions: Research, Development, Diffusion, and Evaluation. The seven primary skill areas to be addressed relating to the functions of RDD&E personnel in education are:

1. Conceptualizing issues and processes in education
2. Designing techniques to carry out educational goals
3. Setting educational objectives
4. Measuring and evaluating educational objectives
5. Summarizing and communicating outcomes
6. Implementing outcomes
7. Identifying and incorporating attitudes, values, and practices of minority groups in the educational process

Unique features of rationale, content, and process of the proposed design: To determine the existing manpower needs for research, development, diffusion, and evaluation personnel in education, a national survey was made of a representative sample of agencies and institutions. Included were research and development centers at colleges and universities, research institutions and agencies, state departments of education, schools and school systems, and business and industrial organizations. A systems approach was selected as the most effective means for developing a training program.

The system selected to develop the proposed training program is the Developmental Process. In use for the past five years at the Southwest Educational Development Laboratory, this process provides efficient ways for formulating, developing, testing, and evaluating educational products and learning systems. To insure the success of a system, there are six interrelated stages through which that system must progress. These include (1) context analysis, (2) conceptual design, (3) product design, (4) pilot test, (5) field test, and (6) marketing and diffusion. After three and one-half years of progress through each stage of the developmental process, the proposed training program is anticipated to be a complete and effective system.

During the context analysis and conceptual design stages, the training system was divided into four subsystems: diagnosis, training, placement, and management. The diagnostic system will be based on an in-depth analysis of organizational needs and goals, individual needs and goals as they relate to that organization, and a series of diagnostic tests. From this information a diagnostic profile will be created and used to develop individual, modular, instructional units. In this manner the training subsystem will provide flexible and appropriate training material for each agency and individual to be trained. An exportable and individually tailored training package will afford maximum effectiveness for the trainee and his agency and a minimum of disruption to normal work patterns in the established organizational setting.

The management subsystem will coordinate all elements of the training system. Retrieval programs for the subsystem, initially developed and tested at the Santa Clara Center for Planning and Evaluation, will provide information on agency and individual diagnoses and followup evaluation material. The placement subsystem will retain information on agencies and institutions interested in trainees, trainees who have completed the program, internship sites, and evaluation data for trainees and their supervisors. The interaction of these four subsystems will lend strength to the training program as a whole and provide an appropriate structure for the effectiveness and control of the system.

Specific course content will be aimed at providing knowledge and developing skills to improve trainees' ability to handle the most pressing educational problems. Studies of different cultures and socio-economic levels, of relationships between the school world and the larger community, and of environment and ecology, as well as explorations of human relations, teaching methods, and the effects of poverty and deprivation will afford a broad-based approach for developing new skills. Trainees will also be taught about the processes of development of educational products and methods, systems approach and analysis, the processes of change, the aspects of self-improvement, and the elements of planning and management.

In summary, the proposed training system will incorporate a wide variety of institutional and individual needs. Through the use of modular instructional units, the most flexible and exportable training can be achieved. Internship experiences, where applicable, will be offered to give the trainee an opportunity to practice new skills in an organizational setting similar to that of the agency for which he has trained. Individuals who have completed training will be placed in accordance with their competency levels and skills, as revealed by the information on the diagnostic profiles. Built-in mechanisms for evaluation and revision will assure the most suitable and efficient means for the development of training in relation to the goals outlined by the agency. Finally, the proposed training program will produce competent, professional individuals, equipped with the skills necessary to meet the demand for educational research and research-related personnel in education.

ABSTRACT FOR VOLUME 1

In May 1970, the United States Office of Education issued a request for proposal of new training designs for research, development, diffusion, and evaluation personnel in education. Through Southwest Educational Development Laboratory, a consortium was organized to respond to USOE's request. The consortium members are: Southwest Educational Development Laboratory, Texas Education Agency, the University of Texas College of Education, the University of Texas Research and Development Center for Teacher Education, Educational Development Corporation, Education Service Center - Region XIII, Austin Independent School District (all located in Austin, Texas); and Louisiana State University College of Education (in Baton Rouge, Louisiana).

Personnel needs in RDD&E were assessed through in-depth interviews conducted on a nation-wide basis in 21 selected institutions engaged in one or more aspects of research, development, diffusion, or evaluation. The results confirmed extensive national and regional needs for trained RDD&E personnel. Although there was a demand for additional professional RDD&E personnel, the study found no formal training and only minimal informal training in the agencies interviewed.

An extensive review of the professional literature revealed that personnel competent in certain skill areas are in very high demand; however, such personnel are limited. The skill areas are:

- conceptualizing issues and processes in education
- designing techniques to carry out educational goals
- setting educational objectives
- measuring and evaluating educational outcomes
- summarizing and communicating outcomes
- implementing outcomes
- identifying and incorporating attitudes, values, and practices of minority groups in the educational process

A conceptual analysis of the competencies related to the professional specialities of RDD&E showed these high-need, low-availability skill areas to be important in all aspects of the profession. Therefore, the consortium members concluded that the proposed training program should focus on these areas of need.

Of the alternative approaches to training, a systems approach utilizing individualized instruction was decided to be the most viable. The consortium members agreed that this approach would be conducive to training a variety of professionals and paraprofessionals to equip them with needed skills. The proposed training system has four subsystems: diagnosis, training, management, and placement. Training would be of two types. The first would consist of modularized packages of material that stress the conceptualization of specified skills. These packages would be used by the individual in his normal work or education environment. The second type would be a structured internship experience to occur after a critical mass of skills had been developed. This internship would be based on the individual's previous experience and perceived future professional role. Careful supervision of these internship experiences would be carried out by the training agencies.

The consortium proposed that the development of this training system

would take place over a four year period through the following developmental steps. During the first year of operation, efforts would go into designing and testing individual modular packages in consortium agencies and a few selected national agencies as well as designing the components of the other subsystems. During the second year, the individual packages would be combined into the subsystems of diagnosis, training, placement, and management control and used to train selected individuals. During the third year, the entire system would be tested as a whole unit in a number of selected institutions on a national basis. During the fourth year, the tested training system would be installed at various agencies throughout the nation.

At the end of the operational phase of the proposed program, a completely exportable system of training would be available for use by any institution in the United States. As a direct result of the consortium's training effort, approximately 550 individuals would be available to fill critical needs in the educational community.

VOLUME I

DESIGN OF THE TRAINING PROGRAM

TABLE OF CONTENTS

PLANNING PROCESS

Consortium Structure and Initial Activities

In April, 1970, the United States Office of Education issued requests for proposals to train personnel for research, development, diffusion, and evaluation functions in education. An urgent need for such specialists indicated that new patterns for training RDD&E personnel in education were necessary.

Several institutions in the Texas-Louisiana area were already engaged in the training of educational research and research-related personnel. These institutions included Southwest Educational Development Laboratory, Texas Education Agency, the University of Texas College of Education, the University of Texas Research and Development Center for Teacher Education, Educational Development Corporation, Education Service Center (XIII), and Austin Independent School District. These organizations collectively were involved in all phases of educational research, development, diffusion, and evaluation. Members had the expertise and the personnel to contribute to all stages of developing and implementing a training program. Additional expertise was recruited from institutions throughout the United States on a consultative basis.

These institutions as a consortium responded to RFP 70-12 with a proposal to design innovative approaches in training RDD&E personnel. By pooling the experience and knowledge of all groups, more innovative and dynamic plans for training could be accomplished.

With Southwest Educational Development Laboratory as coordinating agency, the consortium acted in May, 1970, to construct a response to RFP 70-12. The response emphasized a training system that contained modular and exportable components. There was consensus among the members that a systems approach to training would provide an expedient and serviceable model in training personnel skilled in carrying out research, development, diffusion, and evaluation. Since June, 1970, the consortium members have met regularly to expand and develop their modular approach to the training of RDD&E personnel. In October, 1970, Louisiana State University entered the consortium.

To develop a broad-based training program working relationships were established with institutions across the country. During developmental phases the College of Education at Arizona State University and the Human Development Institute indicated an interest in working with the consortium in an exchange of services and products. The Pennsylvania State Department of Public Instruction offered to review formal training procedures by participating in a pilot training program within its own departments.

The consortium is based in Austin, Texas, a regional center of intense educational research. This site enables collective action by consortium members while facilitating working relationships with national educational institutions.

Each consortium member contributes unique assets to educational development. Their combined efforts should lead to the development of a unified training program. Specific information about the consortium members follows:

A. The Southwest Educational Development Laboratory is one of eleven Title IV (ESEA) education laboratories engaged in the development, evaluation, and diffusion of quality educational processes and materials throughout the United States. The Laboratory presently has a staff of over 200 personnel and is involved in the following development areas:

- early childhood education
- early elementary education
- multicultural/social education
- migrant education
- mathematics/science education
- language development and reading (bilingual and English-as-a-second-language)
- teacher training and staff training development to support the above programs

In designing models to meet the critical needs for training, the Laboratory uses a systems approach to the training development effort.

The Laboratory conducted an assessment of critical educational needs. After studying the possible alternative strategies of meeting these needs, it designed a conceptual framework for implementing these strategies for developing specific training modules. The Laboratory as a consortium member will test modules and evaluate their progress and effectiveness through a continuing feedback system. It will provide opportunities for internships and student placement. The Laboratory will participate with other consortium members in diffusing successful training modules.

B. The Louisiana State University College of Education, at Baton Rouge, is currently engaged in educational research and service functions for the public schools of Louisiana. The Louisiana State University Bureau of Educational Research, which is one of three departments of the College of Education, has proposed to clarify entry characteristics, aptitudes, and skills which will maximize the attainment of critical competencies in career development of educational research and development. Similarly, LSU has proposed to aid in the design of training components which will mix on-the-job experience with structured individualized learning. Training positions for apprentices in on-going programs will be instituted.

Further, Louisiana State University has agreed to assist in the testing of alternative training methods and in the revision of adopted training procedures. The institution also will participate in the dissemination of training materials on the public school level.

C. The University of Texas R & D Center for Teacher Education is one of nine educational research and development centers funded under Title IV (ESEA). The R & D Center's program was devised (a) to bring together a critical mass of interdisciplinary talent and other research resources from the behavioral sciences, (b) to focus on the crucial educational problem areas of teacher education by means of a long-range, coordinated effort, and (c) to develop innovative programs in teacher education and related fields.
The R & D Center has assisted in identifying the functions and skills which are essential to developing critical competencies and a commitment to a career in educational research and development.
In addition, the Center has proposed to aid in the design of training components which blend apprenticeship experience with individualized learning experiences. Paraprofessional training positions also will be designed for on-going programs. It will assist in the development of alternative training approaches and in the continuing revision of training procedures.

D. The Austin Independent School District, located in Travis County, Texas, serves almost 54,000 students in 70 schools and has a professional staff of 2,700. Academic programs extend through all grade levels, from kindergarten through twelfth grade. Vocational-technical courses are available at appropriate levels. Ethnic distribution is as follows:

Anglo-American - 65.9%
Afro-American - 13.7%
Mexican-American - 20.1%.

AISD has proposed to provide training personnel experienced in administration, finance, curriculum, guidance, and accounting. Training stations and test sites are available in the Austin schools for many different kinds of educational activities.

E. The Education Service Center - Region XIII is one of twenty centers in operation throughout Texas cooperating with school districts to improve educational opportunities for all children. The Center offers services which previously have been unavailable or financially prohibitive to local schools. These services include consultant services to faculty and administrators, in-service training in many areas of curriculum, and computer-assisted instruction. The Region XIII Center serves 68 school districts with a total enrollment of over 100,000 students in a fifteen-county area.
The Service Center has proposed to act as an apprenticeship site, serve as a setting for research experiences, and act as an agent to field test training modules. Further, it has proposed to assist in identifying objectives of the training program.

F. The Texas Education Agency is responsible for the administration of public school education in Texas. Functions assigned to the Agency by the Legislature are:

- determination of the extent and quality of basic educational services
- assisting local administration units in carrying out their responsibilities

- . coordination of the selection, purchase, and distribution of textbooks
- . development and application of standards for certifying teachers
- . accreditation of schools

The Agency will assist in the operational test phase and will provide work experience and internship opportunities for trainees. Agency representatives will conduct evaluation activities. They will offer employment opportunities to persons trained in the consortium's program.

G. The University of Texas College of Education at Austin serves 3,500 undergraduates and 800 graduate students. The campus has a total enrollment in excess of 40,000 students. The College of Education has several departments, all of which have programs and personnel necessary to the development and implementation of a training program.
The College of Education has made available courses, seminars, internships, and workshops at both the graduate and undergraduate levels. Personnel and doctoral level trainees in the USOE Multi-Disciplinary Program for Training Educational Research Specialists will be permitted to participate in appropriate areas of the training program.

H. The Educational Development Corporation has engaged in a number of research and development enterprises, involving tests, programmed instruction, and evaluation. Since 1956 it has contracted with the Air Force, Army, various industries and universities, and the Texas Department of Public Safety. Contracts have involved aptitude, achievement, and opinion measures; test and scale analyses; personnel research; occupational analysis; programmed tests; correspondence course design; and design of software for educational training and testing machines.
EDCo has committed itself to serve as a placement facility for three to six interns per year to give them needed experience in research, development, and evaluation. It also has proposed to serve as a sub-contracting agency in the design and development of modular short courses or mini-courses for reinforcing or retaining students at all levels in research, development, diffusion, and evaluation.

The above eight organizations and universities form the consortium structure for the Training Design. Other agencies participating in development and evaluation of materials include:

- . Santa Clara County Office of Education Center for Planning and Evaluation
- . Pennsylvania Department of Public Instruction
- . Human Development Institute, Behavioral Sciences Division, Bell and Howell
- . Brigham Young University
- . Arizona State University

Rationale for a Training Design

Research of National Needs

The rationale in designing a training program was based upon the determination of national needs. The findings from a literature review and an interview research survey revealed needs in terms of skills and educational entry levels required in RDD&E activities. A summary of the research follows.

Rationale for Research Methodology

A paradigm was designed for review of critical and pertinent data for three general programmatic phases: (1) the determination of national needs in RDD&E; (2) the identification and selection of strategies; and (3) the definition and expansion of selected strategies. The purpose of the paradigm was to provide a means of organizing research materials and of grouping the materials according to type of information. The taxonomy of the paradigm identifies broad contextual areas in the literature.

A. Nature and scope of organization or agency (if available).
B. Structure of existing training programs (classification of supervisors, how determined, how program is directed, personnel required).
C. Role of supervisory/managerial, decision-making, and planning personnel (coverage where useful of intra-organizational structure).
D. Determination of (a) educational entry levels (where available); (b) particular kinds of experiences; and (c) skills required.

(Although these three areas will form the bulk of research for material gathered under Section D, they are coordinated with the interview instruments:

1. Areas of specialization
2. Prior work experiences
3. Specific functions
4. Training programs.)

E. Methodology by which training programs in RDD&E are evaluated.

Questions shaping the methods of research were posited as general directives.

A. What are the rational needs for RDD&E personnel?
B. How are these needs determined?
C. What is the availability of training programs to meet those needs?
D. How are jobs identified (i.e., what functions are to be performed)?
E. What are the job requirements (i.e., skills necessary to perform the functions)?
F. What educational entry levels are important background for these tasks (if any)?
G. What experience capabilities (if any) are important?

As the consortium evolved a general structure and functioning body, it developed five goals for implementing a training program.

A. The consortium would provide qualified training personnel.
B. The consortium would recruit talented students through its agencies, as well as through other national constituents. (See "Criteria to Implement Strategies.")
C. The consortium would develop and evaluate training materials.
D. The consortium would obtain and execute research, development, demonstration/dissemination, and evaluation projects to serve as locations for internship experiences. (For information on participants and their commitments refer to section on Criteria to Implement Strategies.)
E. The consortium would provide placement assistance to trainees completing the program.

These goals were the basis for designing an instructional training process according to national RDD&E needs.

Research Methodology

Research methodology contains two general sections. One presents a general statement of the tools of review and the methods employed. The other discusses the interview instrument that was used in gathering "needs" information.

The available literature was reviewed to update knowledge of training programs. The immediate emphasis was on national needs in the RDD&E community and on the availability of training programs to meet those needs.

The second emphasis focused on educational entry level and experience capabilities of personnel. A classification system for functions and skills was adopted from a study by Worthen and Gagne (1969).

Bibliographical materials were obtained from a Defense Documentation Center computer-search of U.S. Government Research and Development reports (CFSTI), a search of the 40,000-item ERIC microfiche collection, a review of the current educational periodicals through the Education Index and Current Index to Journals in Education, published works and bibliographies on training theory and methodology, and consultation with the Southwest Educational Development Laboratory's Documents Specialist.

The objective of the Interview Research Survey was to determine as accurately as possible the extent and nature of existing training programs for RDD&E in agencies likely to have such needs. Because the consortium members represented a cross-section of such agencies, they decided that interviews should be conducted with attention to establishing geographical distribution in the research. An interview instrument was designed to ascertain information on existing training programs. The interview questions were categorized under four major headings relating to functions within an agency. Six educational entry levels (high school through Ph.D.) were addressed under each heading. The major headings were (1) areas of specialization; (2) prior work experience; (3) specific functions; and (4) extant training programs. Matrix sheets were provided at the end of the interview questions for summaries of the educational level in each area. The interviews provided better definitions of entry levels and identified the gaps between these levels (experience capabilities) and skills required to perform RDD&E tasks.

Review of Literature

The literature revealed a critical shortage of trained personnel in RDD&E fields. The report by Hopkins and Clark (1969) stated that in 1964,

traditional employment settings for research, development, and diffusion personnel were schools of education and public school systems. These institutions employed, respectively, 1,200 and 500 RDD&E personnel. In recent years there has been a greater demand for trained individuals in additional settings such as state departments of education, private research institutes, educational agencies and laboratories, and business-industrial organizations. Generally, all research findings indicated that the demand, still on the increase, far exceeded the supply.

The Elementary and Secondary Education Act of 1965 has been cited by Hopkins (1969) as dramatically changing the needs of the RD&D community. ESEA-created agencies, such as the educational labs, ERIC Clearinghouses, Title III centers, and R & D centers, have already increased the demand for persons several-fold.

Hopkins and Clark (1969, pp. 119-120), citing studies by Griffiths (1959), Fattu (1960), Buswell (1966), and Sieber (1966), characterized the United States educational RDD&E community in the middle-sixties as follows:

> 1) The preponderance of RD&D personnel was located in college and university settings, functioning as individual researchers on a part-time basis.
>
> 2) Most individual researchers reported devoting time to RD&D activity, and the modal time reported was very much part-time, ranging from one-fifth to one-third.
>
> 3) Research personnel located in schools of education were most likely to be spending a small percentage of time on their own research activity.
>
> 4) Within the college and university setting, 50 percent of the RD&D personnel were affiliated organizationally with a school or college of education.
>
> 5) State departments of education personnel were chiefly normative researchers employed in research divisions.
>
> 6) Schools and school systems were represented by some teachers, counselors, and administrators working for a small percentage of their time on RD&D projects and by data gatherers

functioning in a research division.

7) Few development and diffusion personnel seemed to be functioning in the RD&D community in 1964, and even fewer were identified through the questionnaire and search techniques employed in the [Hopkins-Clark] study.

Hopkins-Clark further indicated that, by 1966, the functional distribution of RD&D personnel was:

Research - 65%
Development - 25%
Diffusion - 10%

For a more detailed breakdown of RDD&E personnel in 1964 see Table I, "Sample of R, D, and D Personnel by Agency Setting and Functional Job Emphasis - 1964." Table I follows on the next page.

In their comprehensive study of RDD&E needs, Hopkins and Clark (1969) drew together previous studies with their own research and surveys in order to compile the following findings:

> Growth in demand on the order of 1:4.4 would occur in schools and colleges of education, but, more importantly, a major portion of that increased demand would be for persons making a career commitment to educational RD&D. Thus, the proportion of program personnel increased to 32 percent of the total, versus 13 percent in 1964.
>
> An approximate 50 percent increase in demand for persons employed in schools and departments of psychology and a doubling of the demand for persons in other behavioral and social science departments would produce little variation in the form or nature of the commitment made to educational RD&D.
>
> The commitment of persons in other disciplines and academic areas would similarly vary little, but because of the demand for their services by (1) regular and special D & D projects and (2) NSF course content improvement projects, perhaps eight times as many positions would be available in 1974 as were estimated in 1964.
>
> Little change would occur among persons in college and university administration units, either in their number or in the form of their commitment to RD&D.
>
> Demand for RD&D persons in the United States Office of Education would be similarly static. The major demand

TABLE I

.—SAMPLE OF R,D, AND D PERSONNEL BY AGENCY SETTING AND FUNCTIONAL JOB EMPHASIS--1964*

Setting	R, D, D Program Dirs. and Staff				R,D,D, project directors and staff	R,D,D, training program directors and staff	Individual R,D,D Personnel				Stimulators and coordinators of R, D, and D activities	Total
	Outside-funded	Res. and service bureaus	Institutional research	Sub-total			Hard-core prod.	Reg. prod.	Occa. prod.	Sub-total		
Colleges and Universities												
Schools and Colleges of Education	7	124	3	134	39	--	42	187	440	669	15	857
Schools and Depts. of Psychology	1	48	1	50	14	1	19	107	168	294	----	359
Other Behavioral and Social Science Depts.	1	45	-----	46	11	--	32	76	100	208	1	266
Other Discipline and Academic Areas	--	14	-----	14	7	1	13	37	62	112	10	144
College and University Administration Units	--	2	62	64	1	--	-----	5	35	40	5	110
Sub-total	9	233	66	308	72	2	106	412	805	1,323	31	1,736
Federal Agencies												
U.S. Office of Education	--	18	2	20	-----	--	21	31	16	68	9	97
Military Agencies	--	14	7	21	2	--	4	1	1	6	3	32
Other Federal Agencies	--	16	3	19	1	--	9	5	12	26	4	50
Sub-total	0	48	12	60	3	0	34	37	29	100	16	179
State Agencies												
State Departments of Education	--	36	11	47	3	--	2	5	13	20	4	74
Other State Agencies	--	8	-----	8	12	--	1	5	22	28	2	50
Sub-total	0	44	11	55	15	0	3	10	35	48	6	124
Schools and School Systems												
Local Public School Systems	--	1	117	118	10	--	1	7	47	55	3	186
Other Schools and School Systems	--	2	26	28	-----	--	-----	-----	6	6	----	34
Sub-total	0	3	143	146	10	0	1	7	53	61	3	220
Private Research Institutes and Agencies												
Private Research Institutes	--	87	-----	87	2	--	2	2	1	5	2	96
Private Social Service and Welfare Agencies	--	9	-----	9	1	--	4	6	7	17	1	28
Sub-total	0	96	0	96	3	0	6	8	8	22	3	124
Professional Associations												
Professional Education Associations	--	42	-----	42	4	--	-----	-----	-----	-----	----	46
Related Professional, Public, Lay Assoc.	--	9	1	10	1	--	-----	-----	-----	-----	----	11
Sub-total	0	51	1	52	5	0	0	0	0	0	0	57
Inter-Agency Organizations												
Educational Laboratories	--	-----	-----	-----	-----	--	-----	-----	-----	-----	----	0
Other Inter-Agency Organizations	--	24	-----	24	4	--	-----	-----	-----	-----	----	28
Sub-total	0	24	0	24	4	0	0	0	0	0	0	28
Private Foundations	--	1	-----	1	1	--	2	-----	-----	2	3	7
Business and Industrial Organizations	--	45	-----	45	2	--	0	-----	-----	0	0	47
Total	9	545	233	787	115	2	152	474	930	1,556	62	2,522

*From David L. Clark and John E. Hopkins, "A Report on Educational Research, Development, and Diffusion Manpower, 1964-1974," p. 76.

foreseen here was for program managers and processing personnel (not limited to RD&D programs).

An approximate tripling of demand for RD&D program personnel in state departments of education would increase the possibility, at least, of state departments having sufficient personnel to prepare state plans, stimulate innovation, evaluate major programs, and conduct research on the effectiveness of educational programs in their states.

Growth in demand for development and diffusion personnel (primarily) on the order of four times the 1964 population would occur in schools and school systems. Continuation of current staffing patterns would result in much of the activity in this setting being either (1) inner-directed demonstrations of quality facets of the regular school program, or (2) provision of additional "special services" normally provided by many school systems.

Creation of an educational development capability equivalent to the research capability in the private sector of the economy would result in a 1,200% increase in demand for RD&D personnel in private research (and development) institutes and agencies, thereby moving it into the position of being the second largest setting (after schools and colleges of education) for RD&D personnel.

Projected growth in professional associations of 1:6 vis-a-vis the 1964 population would be attributable to increases in diffusion personnel in ERIC Clearinghouses.

Growth in demand on the order of 1:28 would occur among inter-agency organizations because of the expansion of both the educational laboratories and other inter-agency organizations. The personnel in these programs would all be embarking on a new rack in their career lines, since these are predominantly new programs with new objectives, so staffing would continue to be a matter for concentrated attention by the directors of these programs.

Increased demand on the order of 1,200% would reflect the expanded interest, involvement, and capital investment of business and industrial organizations in educational development and diffusion.

A continuing shift in the allocation of monetary and human resources toward development and diffusion was projected to result in 1974 allocations on the order of 33% to research, 50% to development, and 17% to diffusion activities (pp. 294-296).

The same report by Hopkins and Clark assessed emerging roles and needs in educational RD&D from three data sources: relevant literature,

expert opinion, and operating needs. Their conclusions were:

> 1) The roles most likely to emerge are (a) director and staff of outside-funded development programs, (b) technical support staff, (c) development project personnel, (d) training personnel, and (e) stimulators and coordinators of RD&D activities.
>
> 2) Among the actions most urgently needed by the field are (a) development of the content and methodological basis for the emerging roles in a form suitable for use in training programs, and (b) immediate recruitment and training of a technical-professional class of RD&D support-personnel.
>
> 3) Emergence of diffusion roles will be delayed because performance of diffusion functions has not yet been adopted as an objective by any institution.
>
> 4) The response of schools and colleges of education will be central to the success of the new thrusts of educational RD&D.
>
> 5) The scope of development and diffusion responsibilities within several settings is unclear and, consequently, the D & D roles to emerge in these settings will be determined by experience over time.
>
> 6) Private development and diffusion institutes and agencies will lead the way in creating specialist roles within the development and diffusion functional areas (1969, pp. 420-421).

In the American Educational Research Association Task Force Reports, June, 1970, Sanders and Worthen utilized a specially prepared interview schedule (March, 1970) to determine educational research and research-related employers' perceptions of personnel needs in the areas of RDD&E. In terms of relative importance to employers, evaluation, development, and research respectively received highest priority. Diffusion was viewed as relatively less important, as it had been in the Hopkins-Clark study.

The literature also made clear that most, if not all, programs in RDD&E occurred in universities and involved persons working toward advanced degrees. Training conferences at the University of Oregon (Hamreus, 1967) and Ohio State University (Cook, 1969), for example, required participants

to have a college degree as a minimal educational entry level.

The U.S. Office of Education has responded to demands for educational research personnel by (1) authorizing programs for recruiting capable undergraduate career prospects, (2) financing institutes which provide short-term intensive training in particular aspects of research, (3) sponsoring special projects, including seminars, workshops, personnel exchanges, in-service training programs, and other non-degree training, and (4) developing program grants to strengthen college and university staffs and to develop curricula for training in educational research (National Center for Educational Research and Development, 1969, pp. 121-122).

New changes in policy by the National Center for Educational Research and Development will lend increased support ($2.3 million in FY 1971) for (1) planning and evaluation studies, (2) development of training materials, and (3) development of new training models or prototypes. The Center cited long-range, integrated, educational R & D manpower planning as "virtually nonexistent." It circulated RFP kits to schools of education, various departments in the social and behavioral sciences, state departments of education, R & D centers, regional laboratories, and individuals and organizations known to have had an interest in utilizing or developing RDD&E programs (Hanna, May 1970).

The literature reviewed above and cited in this section verified that a critical shortage of trained RDD&E personnel exists. The synthesis report from the Interview Research Survey will further illustrate that these needs are critical in the field of education.

Synthesis Report from Interview Research Survey

The Interview Research Survey conducted by designated representatives of the consortium was the second part of the research phase of proposal RFP 70-12. Data were gathered by the consortium members and synthesized

in order to analyze the national needs for RDD&E personnel. The specific considerations were existing RDD&E activities, existing training programs, function and skill specification, selection of personnel for training, and strategies around which programs were designed.

It should be clear at the outset that the surveys were designed to extract information to aid consortium members in activities of research and design. The surveys provided first-hand information on national needs. The final objective was a training design to produce competent, functioning personnel in RDD&E. The interviews were synthesized according to type of agency, functions in that category, applicable educational levels, and the needs to which the type of agency might address itself. The agencies were categorized as follows: (1) colleges and universities; (2) research institutions and agencies; (3) state departments and agencies; (4) schools and school systems; (5) business and industrial organizations. Interviews of R & D centers at colleges and universities show a total of 19 engaged in RDD&E activities. The lower educational entry levels, particularly high school and two-year college, utilized individuals for data processing tasks and for production of visual materials to illustrate a particular phase of an RDD&E activity. Interest, intelligence, and experience capabilities were most significant at this level. Whatever training was necessary for these tasks was given on the job. Prior work experience, however, was less important at these first two educational entry levels than experience at higher levels such as college graduate, graduate-plus-one-year, etc. The higher the educational level, the greater the expectations of prior work experience become.

No other training of a formal nature was provided for personnel entering jobs in RDD&E functions other than on-the-job training for data processing. More often than not, college graduates and post-graduates became trainers

as well as trainees, but training occurred through tutorial sessions, personal interaction, and individual self-study. The Ph.D. was most often employed in course design, hardware and software design, systems analysis, and program direction.

Research institutions and agencies interviewed were categorized as those having activities exclusive of university-related functions or those not engaged in profit-oriented production. RDD&E functions involved contract-jobs in community projects and government-related research. An estimated 20 percent of tasks to be performed required pure science backgrounds for research activities. Experience capabilities as well as prior work experience played the most important role in employment at this entry level.

Programmers and processors were taken primarily from the two-year college groups. Related functions to the first two educational entry levels were positions as assistants to professional staff who were at graduate-plus levels. Many college graduates were hired as professional staff assistants to work in all four areas of RDD&E as technical writers, administrative secretaries, and program curriculum assistants. Most of their activities centered around research functions.

Three positions were filled at the Ph.D. level: (1) administrative counselors; (2) curriculum and communications specialists; and (3) administrators in programs. No formal training programs existed. Individuals were hired on the basis of experience capabilities and degree.

A basic qualification of personnel employed for professional positions in RDD&E activities was the ability to design and evaluate work performed in an experimental environment. Coupled with this qualification were flexibility and creativity in an individual's thinking. In all instances the agencies involved indicated that when on-the-job training was necessary,

three to six months were required to produce an adequate level of capability to perform the specified task.

The state departments of education comprised the third category of agencies interviewed. The specific functions for which people received on-the-job training through an informal orientation program were practical research or problem-solving, systems analysis, budgeting, and planning. Most of this orientation was conducted by paraprofessional staff where possible. The remainder occurred outside the agency at such places as AERA conferences and university R & D centers.

For individuals requiring more highly-sophisticated skills in RDD&E activities, only those with previous experience were hired. High school and two-year college personnel were hired as clerical and technical staff in such positions as secretaries and data processors. All professional personnel were hired with a Master's degree and three years' experience or a suitable equivalent. Those below the Ph.D. level were strongly encouraged to continue their studies toward a degree during their employment.

Experience capability requirements increased as the degree-level increased and, consequently, as the job requirements increased. All indicated that they could not find a minimum amount of RDD&E personnel sufficient to perform activities required by their agencies. Among state agencies, development and diffusion were the two areas of greatest need. Lack of time, effort, and commitment were the greatest constraints caused by an absence of formal training programs or of adequately-trained personnel.

Schools and school systems reflected a large deficiency of RDD&E personnel. The range of employment activities was not unlike those agencies reported above for lower educational entry levels. Clerks, typists, business-machine operators, etc., were employed from the high school and two-year college levels.

At the college graduate level, individuals were employed as data analysts, program designers, technical writers, and evaluators. Most cases revealed that the individuals performing these tasks had insufficient training to conceive the design and development of a program or to evaluate its effectiveness from the product design phase through the marketing or implementing phase.

On the post-graduate and Ph.D. levels, personnel were employed as counselors, administrators, teachers, and program directors. Prior work experience was a major factor where schools could consider that luxury, but most instances revealed that RDD&E personnel who were specifically familiar with public school functions were scarce, if available at all. Other than a lack of trained personnel, the constraints of cost, personnel involvement, and assessment presented the largest problems. Short orientation programs were often given, but nothing could be provided in the way of sophisticated training for RDD&E personnel. Primarily, the job specifications were for individuals to perform development and evaluation activities. Some schools had in-service staff development workshops but the range of activities was so broad that a concentration on RDD&E specifications received little more than cursory attention.

Business and industrial organizations form the last category of agencies surveyed. These agencies were grouped as profit-oriented and job-contract organizations. The educational entry levels followed the patterns of the above agencies with high school and two-year college personnel filling capacities as secretaries, clerks, data processors, etc. These personnel received little or no training for their tasks. Some orientation was required, but experience was the major factor.

The emphasis on prior work experience, however, decreased as educational entry level increased to Ph.D. Some attempt had been made to hire college

graduates fresh from the classroom as research and development personnel and to train them in-house for these specifications, but the success of the program was only moderate. At the one- and two-year graduate levels, individuals with experience were employed when possible, but more often than not, they were employed without previous experience. Ph.D.'s were employed at times because of the "name" they had made in an area whether or not their experience would be specifically relevant to the new task.

To review the main findings, the following summary provides an overview of extant facilities, and the tables provide additional information on present RDD&E activities. The data from the tables along with the literature review provided the consortium members with insight into the critical shortage of trained personnel and formed the basis for designing strategies to correct this shortage. Twenty-one surveys revealed that:

1) No agencies had formal, highly-structured training programs for college graduates and beyond.

2) Nine agencies had informal or loosely-structured programs at the job level (in-house) and outside seminars or conferences.

3) Six agencies reported that they had only informal on-the-job training.

4) Two agencies reported on-the-job training and a "continuing education" program (i.e., moving toward an advanced degree while employed).

5) Three agencies reported on-the-job training programs for high school or two-year college personnel in data processing.

NOTE ON USE OF THE FOLLOWING TABLES:

(1) The data in these are from the 21 interview surveys which were conducted.

(2) In Table III participation is indicated by agency, function, and level only when the interview seemed to be reasonably clear as to the specific job being performed. If an individual's duties overlapped, credit was given for all functions performed. Thus, where an individual engaged in both research and development, for example, appropriate marks were made under each category.

TABLE II

AGENCY	High School				Two Years College				Four Years College				One Year Graduate				Two Years Graduate				Ph.D.			
	R	D	D	E	R	D	D	E	R	D	D	E	R	D	D	E	R	D	D	E	R	D	D	E
College and University Agencies	1				2				1	2		1	2			2	3	1		2	1	1		
Research Institutes and Agencies (Other than University Labs)		1	2		1		1	1	1	1	2		1	2			7	4	2	2	1	2	1	1
State Departments and State Agencies					1								1	1	1	1	2	2	2	2	2	2	2	2
Schools and School Systems	2								3	2		1	4	3		3	5	5	2	4	3	5	2	2
Business and Industrial Organizations	1			1		1	1		1	2	3	1	1	1	2	1	2	1	1	3	2	2	2	2
TOTALS	4	1	2	1	4	1	2	1	6	7	5	3	9	7	3	7	19	13	7	13	9	12	7	7

TABLE III. A.

ACTIVITY BY FUNCTION AND AGENCY AT ALL LEVELS

AGENCY	R	D	D	E
College and University Agencies	10	4	--	5
Research Institutes and Agencies (other than University Laboratories)	11	10	8	4
State Departments and State Agencies	6	5	5	5
Schools and School Systems	17	15	4	10
Business and Industrial Organizations	7	7	9	8
TOTALS	51	41	26	32

TABLE III. B.

ACTIVITY BY FUNCTION WITH AGENCIES / LEVELS COMBINED

ACTIVITY	Number	Percentage
Research	51	34.0
Development	41	27.3
Diffusion	26	17.3
Evaluation	32	21.3

NOTE: See Appendices A and B for Interview Site Distribution and Interview Instrument

Criteria to Define Skills for Training RDD&E Personnel

After the consortium members researched the national needs through a review of the literature and Interview Research Surveys, the following criteria were developed to define the skills necessary for training RDD&E personnel. The criteria reflected the findings of the consortium on national needs.

1. In order to determine needs, it first would be necessary to identify the functions of RDD&E personnel.
   - A. Job identification, or what needs to be done.
   - B. Task inventory, or what is necessary to do the job. This inventory would be based on:
     1. Skills required to perform the tasks
     2. Entry levels
        - a. educational entry levels
        - b. experience entry levels
        - c. other skills relevant to RDD&E work

2. Having once identified the functions to be performed, it would then be necessary to determine those institutional settings in which both RDD&E personnel will be working and in which more specific demands for these personnel are generated. Settings from which information on these personnel would be gained include:
   - A. National professional registers
   - B. Colleges and universities
   - C. Federal agencies
   - D. State agencies
   - E. Schools and school systems
   - F. Private research institutions and agencies
   - G. Inter-agency organizations
   - H. Business and industry

3. Information as to needs, both local and national would be obtained from these institutional settings by two methods:
   - A. A review of the literature which covered:
     1. Extant training programs for RDD&E personnel
     2. Analyses by authorities of field (or fields) requirements
     3. Projections of future status requirements
   - B. Expert opinion which derived from:
     1. Interview schedules designed specifically to meet consortium information needs
     2. The consortium members themselves
     3. Consultants with relevant specialties

Strategy Selection

Consortium Decisions and Alternative Strategies

Consortium members, in a series of regular meetings, have identified needs and alternative strategies in designing a program to train RDD&E personnel. Decisions by consortium members occurred at three key stages: (1) determination of national needs; (2) selection of strategies and identification of constraints; and (3) definition and expansion of selected strategies for operation.

In July, 1970, the consortium members designed a plan to initiate research on a nation-wide basis to formulate a basic rationale for a training program, The research objective was to determine the extent of existing programs for RDD&E personnel. An interview schedule was designed to provide consortium members with structured guidelines for their interview tasks. The interviews would aid the consortium in determining national needs, skills, and personnel training requirements. Critical points of inquiry included new programs being developed and implemented, and the extent of manpower needs not being met.

At the end of August, 1970, the consortium met and reviewed their progress on determining the national needs for RDD&E personnel. The literature and interview survey confirmed the critical nature of these needs. Between July 24 and August 20, 1970, the Interview Research Survey was conducted by representatives of the consortium members. Southwest Educational Development Laboratory presented an interview synthesis to the consortium during the meeting of August 25, 1970. The synthesis is found in the previous section of this report under "Research of National Needs."

Following the needs study, members turned their attention toward alternative strategies for developing a training program. The advantages

of a training mill versus multiple training packages were discussed. The plausibility of both were noted, with one exception. Training packages could be individualized for person or agency and exported. Such an approach facilitated training generalists as well as specialists in RDD&E functions. Training mills, however, lacked this degree of flexibility in operation. Such attention to strategies made apparent the extent to which needs, constraints, and capabilities were fused. The members discussed the extent to which educational entry levels might be important in meeting the training needs. It was decided that attention to specific skills should be addressed to the basis of a theoretical continuum of RDD&E activities, since many functions overlapped. This approach would be compatible with exportable, modularized packages for training. After strategies had been related to priority needs and constraints, a definition and expansion of strategies began (see Figure 1 on the following page).

On September 8, 1970, the consortium heard a report from Robert Randall and C. Thomas Camp of the Southwest Educational Development Laboratory concerning their meeting in Washington, D. C., on August 26, 1970, with John Egermier of the U.S. Office of Education. SEDL delivered a progress report on the status of Design Proposal RFP 70-12 to John Egermier. John Hopkins, co-author of the Hopkins-Clark report and special consultant to USOE, also attended that meeting. SEDL presented to the consortium the details of the budget structure as anticipated from their meeting with USOE. It was noted that the budget format should provide a break-out of money going into course continuum development and should differentiate between development and such matters as staffing, trainee expenses, physical operations, etc.

Following the meeting in Washington, SEDL contacted various

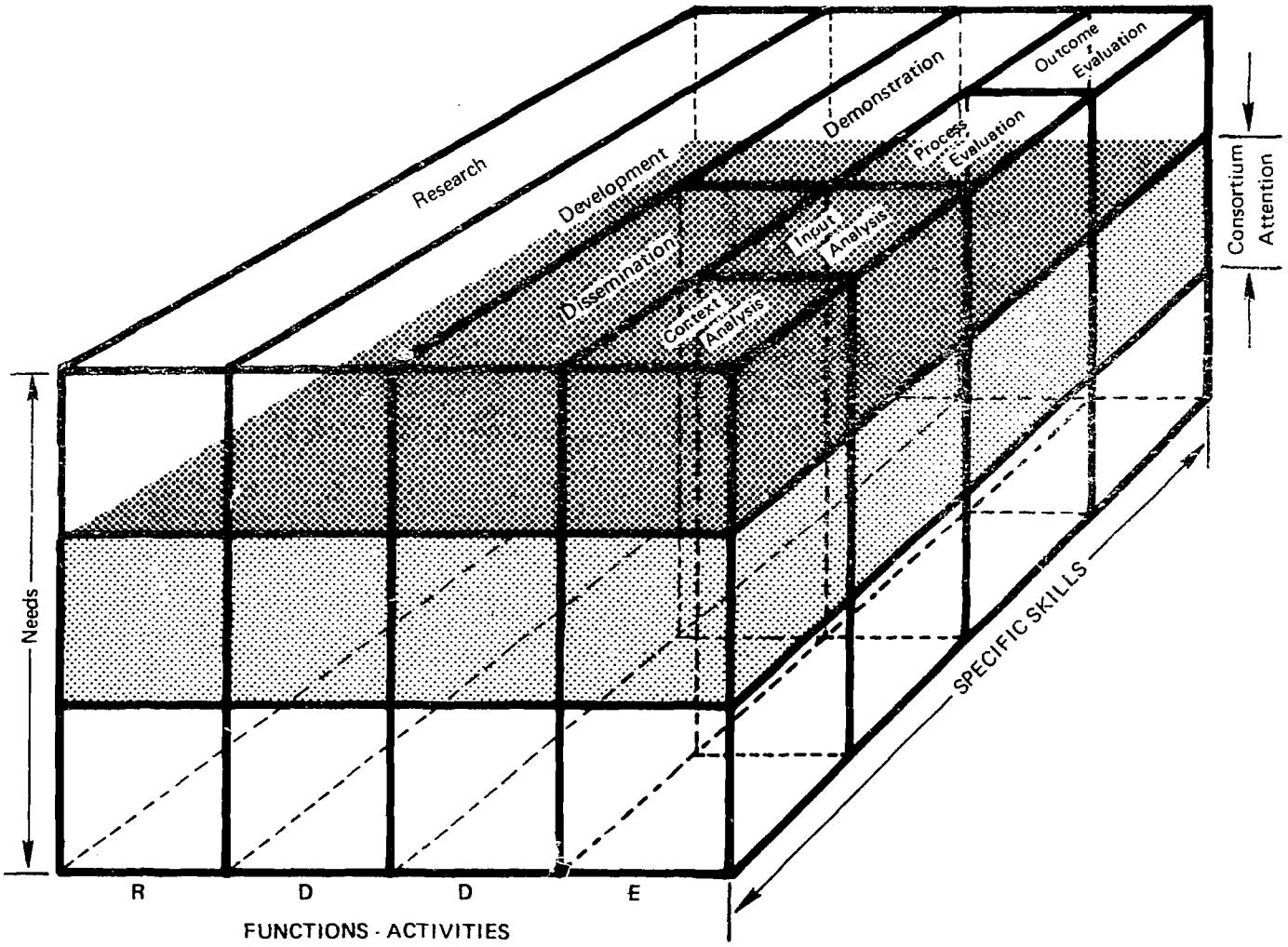

Research
Development
Dissemination
Demonstration
Outcome Evaluation
Process Evaluation
Input Analysis
Context Analysis
Consortium Attention
Needs
SPECIFIC SKILLS
R
D
D
E
FUNCTIONS - ACTIVITIES

FIGURE 1

agencies, organizations, and universities to stimulate interest geographically and to secure indications of those organizations which might have participatory interest in the consortium's program on a pilot basis after January 1, 1971.

On September 15, 1970, Walter F. Stenning was introduced to the consortium members as the new Director of the Division of Training Systems Design, SEDL. Stenning, a former faculty member of the University of Texas, has worked with most consortium representatives on various past projects.

Opening this meeting, Oliver H. Bown of the University of Texas stated that most agencies do not encourage trainers to enter their organizations for the purposes of training staff, since the agencies have survived in the past with informal training and orientation practices. Marshel Ashley of the Austin Independent School District related a need for personnel trained as generalists rather than as specialists in the public schools.

The question of orienting school administrators to the use of training facilities, once established, was raised by Edwin Hindsman of SEDL. He indicated that something should be written into the program that causes potential consumers to look at themselves and how they function with respect to a systematic approach in problem solving. He suggested that it would be difficult for them to use the training modules effectively if they had no defined system of evaluation procedures within their own framework. Ashley indicated that school superintendents have particular difficulty with program accountability and its relationship to evaluation. Ashley, however, reminded the consortium members that the public school system is not the only agency which the program will concern, but it will be necessary to work with supervisors and administrators in public

schools. The consortium decided that a portion of the design should focus on accountability and its implications.

D. Fruchter of the Educational Development Corporation pointed out that one concern of the program should focus on the effective use of consultant services. She stated that often people do not know exactly what kind of data is to be collected or how to apply it once gathered. Agencies must define their own problems before they can adequately use a training program or personnel to solve them.

Once these basic problems were addressed, it was felt that additional study should be conducted to determine exactly which specific skills were most needed and least available. Attention to individual and agency needs would provide stimulus for feedback evaluation on both the trainee and the training materials.

The members of the consortium agreed that in order to determine specific problems in specific areas, it would be beneficial for the consortium to establish five task forces. Each of the task forces would gather specific information regarding the points described below and other relevant material which would be useful in developing a systematized view of initiating, building, and maintaining an RDD&E training program.

These five task forces were:

1. Identification of individuals
2. Diagnosis
3. Training
4. Placement
5. Management

Task Force #1 would determine the various strategies that are available to identify individuals who would benefit from the training program.

Task Force #2, a diagnostic group, would aim at alternative strategies for counseling incoming individuals, various approaches to initiating skill

evaluation, and methods for obtaining from appropriate agencies the levels of competency that the trainees would require.

Task Force #3 would identify alternative strategies for course content and training procedures.

Task Force #4 would be involved in the identification of alternative strategies for assuring placement on a national level at quality institutions of educational research and development.

Task Force #5 would seek various strategies for effectively controlling and interfacing the other aspects of this system such as student progress, evaluation processes of diagnosis, training, and placement. It also would aim at identifying procedures which assure quality evaluation of both the systems process and the product development.

On September 30, 1970, the consortium held a meeting to review tentative task force assignments and the projected activities of those committees. Walter Stenning of SEDL explained the Task Force Documents as a statement of committee activities and skill priorities. Oliver Bown of the Research and Development Center for Teacher Education explained that the committee assignments were based on particular interests, specializations, and availabilities rather than organizational affiliations. The suggestion was made that the University of Texas Research and Development Center and the University College of Education, because of staffing constraints, serve as reviewers of committee reports.

The consortium reviewed the determinant factors in the projected training program. First, the educational level should be limited from three years of college through Ph.D. with exceptions taken into account. Second, a concentration would be made on skills that were not taught in other programs but which were in high demand. Finally, the consortium would begin looking at selection of individuals on the basis of their

ability to fit into particular types of institutions once they were trained. This last consideration would incorporate as broad a range of institutions engaged in RDD&E activities as possible.

The question arose as to the feasibility of training new individuals in RDD&E activities, particularly individuals who lacked specific focus on their professional intentions. The consortium members decided to include this consideration in the selection of trainees. A general orientation aimed toward high-level personnel was planned to facilitate their better understanding of RDD&E training. This orientation, however, would not be a prerequisite for any participating agency to put trainees through the course.

A quota system was suggested to keep the number of new persons to a minimum in relation to those already working in RDD&E activities. It was planned that the fir t year of the program would concentrate on a relatively small, well-distributed group. Once the program became established, it would be available to a wide variety of individuals and agencies.

In mid-October an invitation was extended to Louisiana State University by the consortium to become a member. Membership was approved, and their representative, Fred Smith, attended the consortium meeting held on October 16, 1970.

Walter F. Stenning and C. Thomas Camp of SEDL attended the Seattle conference sponsored by the Oregon State System of Higher Education. During the October 16 meeting of the consortium, Stenning and Camp explained the relationship of the Oregon project to RFP 70-12. Oregon's focus would not be on designing a training program nor on designing training materials but on providing a methodological framework. It was noted that the training program would have to design its own materials rather than try to deal with those consortiums presently working on RFP 70-27.

The consortium meeting of November 4, 1970, opened with a brief discussion of the resource group. Oliver H. Bown of the Research and Development Center for Teacher Education suggested that the resource group might be a pool of individuals from which review could be drawn. This suggestion was agreed to by the members of the consortium. Walter Stenning then noted the lack of qualified individuals across the country who could aid in this pool with regard to the management subsystem. Oliver Bown then suggested Bill Ward who is presently at McAllister College in St. Paul. He would be working with the R & D Center at the University of Texas and could work with the consortium in this respect.

The consortium members began discussion of the preliminary final report for revision. Walter Stenning brought up the importance of assuring minority group participation in the training program. D. Fruchter of the Educational Development Corporation and R. Beauford from Austin Independent School District agreed that most agencies realize the necessity for hiring minority group members in their organizations and therefore would be eager to send them through the training program. D. Fruchter suggested that a minimum quota be set for minority groups, and the members of the consortium unanimously agreed on this suggestion. Oliver Bown suggested that standard entrance requirements be met by all who participated.

These decisions regarding the importance of minority group participation were consistent with the consortium's concern over the visible absence of minority persons in the educational research and research-related fields. The training program would enable minority individuals to be placed directly into the RDD&E field. These trained personnel, by evaluation and feedback, could then contribute to redesigning and implementing programs with

a particular awareness to the needs and requirements of minority group personnel.

Oliver Bown suggested that the number of trainees per agency be flexible. Walter Stenning pointed out that commitment in terms of hours rather than persons might be a more realistic approach, since different training modules would involve different degrees of testing. Robert Randall of SEDL stated that it would be difficult to judge the training modules until completion, since each individual training module will require particular development. These suggestions were agreed upon by the members.

On November 20, 1970, the consortium met to consider specific agency commitments and salary payments. Stenning briefly commented on the trip made with C. T. Camp to Washington, D. C., to deliver the preliminary report to J. Egermier of USOE. It was also mentioned that Stenning and Camp would be visiting Arizona State University in Phoenix to establish definite commitments to the training program.

The consortium members then considered the nature and extent of their commitments to the program. Keith Cruse of TEA suggested that it was difficult for formal commitments to be made without a definite pattern of development. He suggested that SEDL designate the commitments to the individual agencies. Stenning felt that this was beyond the scope of the prime contractor, and that the consortium as a group would have to decide upon the nature of commitments. Stenning agreed to draw up a sequence of development for the group to review before submitting their individual commitments.

Discussion then turned to the methods of payment to the agencies for their staff members. Reid of the University of Texas College of Education suggested that SEDL handle all funds and hire individuals on a part-time basis from the various consortium agencies when appropriate. This would avoid payment of high overhead costs in the agencies. Cruse objected to this method, pointing out that such individuals would then lose a portion of their agency benefits. Stenning also objected on the grounds that the agency's prestige would not then be directly involved.

A second method discussed was payment directly to the agency, which then would decide on the exact distribution of funds. It was decided that each agency would choose its own method of payment.

On December 1 the consortium met briefly to review this developmental sequence and a proposed cost-budgeting of funds. Individual supervisors were to be funded for each year, and also development of materials. An additional sum would be given to agencies housing interns to defray expenses relating to or arising from their internships. During year one, individual modules would be tested in all agencies; during year two, approximately 150 in-house trainees would become involved in training; and during year three, the system as a whole would be tested and 325 interns on a nation-wide basis would participate. The consortium members agreed that supervisory individuals would devote no more than 25 percent of their time in this capacity.

Discussion then turned to the methods of payment to the agencies for their staff members. Reid of the University of Texas College of Education suggested that SEDL handle all funds and hire individuals on a part-time basis from the various consortium agencies when appropriate. This would avoid payment of high overhead costs in the agencies. Cruse objected to this method, pointing out that such individuals would then lose a portion of their agency benefits. Stenning also objected on the grounds that the agency's prestige would not then be directly involved.

A second method discussed was payment directly to the agency, who would then decide on the exact distribution of funds. Although this would involve overhead charges at the University of Texas, the other consortium members felt that this would be no problem within their agencies. It was decided that each agency would choose its own method of payment.

On December 1 the consortium met briefly to review this developmental sequence and a proposed cost-budgeting of funds. Individual supervisors were to be funded for each year, and also development of materials. An additional sum would be given to agencies housing interns to defray expenses relating to or arising from their internships. During year one, individual modules would be tested in all agencies; during year two, approximately 150 in-house trainees would become involved in training; and during year three, the system as a whole would be tested and 325 interns on a nation-wide basis would participate. The consortium members agreed that supervisory individuals would devote no more than 25 percent of their time in this capacity.

Stenning then suggested that if the program is funded, the consortium hold its meetings at various institutions across the country involved in the training program. St. Clair of TEA affirmed that participating out-of-state agencies would then become better acquainted with the program by having a number of their staff attend the meetings in this fashion.

The meetings of the consortium generally have reflected an attempt by the participants to involve their agencies in the development of a broad-based training program as it would relate to their specific needs. There has also been a concern for a training program which would be an effective means for developing RDD&E skills in personnel on more than a regional basis. Each member of the consortium has contributed significantly to the processes of research, investigation, and decision-making for the best possible training system which would meet all the various needs.

Alternative strategies for training were explored thoroughly so that a viable approach could be taken. None of the existing strategies for training proved sufficient to encompass the scope of training skills desired in RDD&E functions.

The resulting decision by the consortium members to adopt a systems approach can be understood by summarizing the training alternatives reviewed by the consortium members.

There were three basic alternatives for training: on-the job training, off-the-job training, and a specialized or systems approach to training. It was decided that the systems approach offered the most flexible and

efficient method of training to meet the urgent needs for personnel.

Consultants were sought to assist in the development of a systems approach. These included Francis Chase, formerly of the University of Chicago, Mike Clark of Arizona State University, David Merrill of Brigham Young University, and Joe Ward of the Southwest Educational Development Laboratory.

The three strategies were studied and reviewed within the context of training criteria. The system would be broad-based, flexible, and exportable. In addition, the system should meet national and regional needs. A brief discussion of on-the-job and off-the-job training alternatives and why these methods were not chosen follows.

In on-the-job training the individual is placed directly into the problem context, where he learns by working alongside persons already skilled in the tasks to be performed. On-the-job training involves several techniques.

Regardless where the trainee spends the bulk of this time, some task orientation is required. Initially he should receive an overview of the organization. When moving horizontally within the organization, some orientation is necessary to explain particular functions and objectives. In this way the trainee is introduced to a step-by-step review and demonstration of the job operations. In this method both written and verbal communication are used.

Job rotation provides the trainee with a series of placements within a given organization. As he moves from division to division, or task to task, the trainee is exposed to different learning situations. In each assignment the trainee receives instruction from the supervisor or from individuals who have highly developed skills in a particular specialty. In any one of these placements, the trainee can be evaluated and instructed.

The consortium felt that training individuals for work in RDD&E could not be successfully accomplished by on-the-job training alone. Unlike many simpler job tasks, educational research and research-related work requires varying levels of competence in a number of complicated and overlapping areas. The utilization of psychometric devices, for example, requires not only skills in mathematics and statistical methodology, but also some understanding of the psychological and sociological patterns that underlie the principles of testing. Simple exposure to these devices would not insure proper application nor interpretation. The consortium felt that on-the-job training must be in conjunction with more formal educational training.

Training outside of the actual job context was the second alternative strategy considered by the consortium. Off-the-job instruction is usually supplemental and varies from short courses to intensive instruction complete with audio-visual aides, textbooks, and other printed materials. These courses may involve skills taught by technicians or full-time teachers. The advantage of off-the-job training is that the individual can devote full attention to training materials. There is difficulty, however, in transferring knowledge into actual task contexts.

Off-the-job training can effectively utilize such measures of instruction as lectures, special study assignments, readings, audio-visual aides, conferences, discussions, and in general any device that is necessary to supplement actual job performance. In order to develop statistical skills, for example, a trainee might be given a lecture and/or film on general techniques in this area, supplemented by home or off-duty time assignments of mathematical problems. After some level of competence has been reached, the trainee could be given an actual assignment, or case study, related to the institution's work. The trainee would be

responsible to a supervisor.

Simulation is another method of off-the-job training that brings the trainee into confrontation with task demands. It has particular utility in some cases because it provides a larger measure of control by the trainer. Trainees are presented with the characteristics of organizational structure and activity while being asked to assume roles demanding task completion. The trainee makes decisions and performs activities that will be critiqued and evaluated.

Programmed instruction is another variation of off-the-job training. Programmed materials are designed to insure that the trainee will deal with content when he is ready to do so during the learning process. The material is constructed so that the student knows the results of his response immediately. The sequence of presentation progresses from easy to difficult contextual stages.

Off-the-job training generally is organized around contextual experience rather than job experience. Both off-the-job and on-the-job training have similarities which allow them to be used in conjunction with each other. The consortium has used aspects of both alternatives in designing modules for training. On-the-job training alone would not adequately cover elementary knowledge levels for performance of RDD&E work. Programmed instruction, lectures, discussions, and textual materials alone were not considered sufficient to develop necessary skills for performance of critical educational tasks. Pretraining diagnosis enables the determination of educational and skill entry levels. Based upon this diagnosis and institutional requirements, the student would then be exposed to specific skills. By using aspects of both alternative strategies in training, off-the-job techniques could be employed to give the trainee a broad knowledge base as well as specific problem-solving capacities. Procedures such as

lectures, printed material, and programmed instruction would be employed as needed. These techniques combined with internship experiences would provide an optimum training experience.

Criteria for Selecting Strategies

Prior to the development of a training program, alternative strategies for training must be considered. Two separate frameworks have been applied in order to establish what alternative strategies are available and then, after a strategy for training has been selected, what factors should be taken into consideration for the development of the training program. Each framework employs a set of criteria to be used as the standard for judgment upon which decisions will be made. Criteria act as either determining or restraining factors in the decision-making process.

Framework for Considering Alternative Strategies:

1. First a working classification must be determined for RDD&E functions for which individuals will be trained. From research and previously conducted studies (AERA Task Force Reports #1, #2, and #3, the primary documents), consortium members have devised the following classification of functions:

A. Research
B. Research-based development, which is composed of:
   (1) invention and engineering
   (2) product testing
C. Diffusion composed of:
   (1) dissemination
   (2) demonstration
   (3) adoption
D. Evaluation composed of:
   (1) context evaluation/situation analysis
   (2) program planning/input analysis
   (3) process evaluation/program monitoring
   (4) outcome evaluation

2. Minimum levels of operation must be defined to support a given strategy. It will be necessary to know:

A. The design of production and management operations required to carry out training activities
B. The knowledge, skills, and sensitivities needed by potential trainees as prerequisites to the training performance
C. A set of indicators that would be acceptable as evidence of the ability to perform such operations

3. Areas from which potential trainees could be drawn are:

A. Institutional settings, such as universities, that would provide interested trainees not previously engaged in formal institutional work
B. Organizations that might desire training for existing personnel
C. Institutional settings that desire retraining participation

4. Concomitant to the Criterion #3, institutional areas or settings that will absorb trained personnel must be determined. The organization's needs must be predetermined. Institutions and agencies that can absorb trained personnel are:

A. Colleges and universities and their agencies
B. Research institutions and agencies other than university laboratories
C. State departments of education and related state/federal agencies
D. Schools and school systems
E. Business and industrial organizations

5. Specific demands or constraints upon a training strategy include:

A. Determining which skills within RDD&E will be taught, including:

(1) specific areas or functions that were found to be greatly in demand by the consortium's first modular report;
(2) specific areas selected as important or crucial by consortium members; and
(3) specific areas found to be important or necessary during the implementation or post-implementation stage(s).

B. The number of trainees for each function and group of skills in the program
C. The screening or diagnostic process for selecting prospective trainees and the specific skills needed or desired

Framework for Developing Training:

1. The design of a training system should include the following:

A. The pressing demands of national and regional needs
B. The objectives of the consortium members' response to RFP 70-12

C. Structured operation and production objectives

2. Consideration must also be given to the demands and problems of implementing a given strategy. These considerations are:

A. Staffing, both in terms of availability and time limitations to include
   (1) training personnel and instructors
   (2) administrative or managerial staff
   (3) evaluation staff for all stages of the program from conceptual design through multiple package diffusion
B. Geo-physical considerations including
   (1) locations for the program
   (2) housing of trainees
   (3) supply of materials
C. Trainee considerations, such as
   (1) recruitment of trainees
   (2) selection or diagnostic process
   (3) attendance requirements
   (4) supplies and materials for the training program
D. Calendrical scheduling considerations which include
   (1) time availability of consortium members
   (2) training and administrative staff
   (3) trainees for program participation
E. Administrative considerations such as
   (1) accounting and disbursement
   (2) budgeting
   (3) long-range planning
F. Cost considerations per unit module and
G. Factors that would arise during the program's operations

3. There are also evaluation processes that must be built into all stages and levels of the training program. Specific and essential requirements for the evaluation program are:

A. Personnel to build in evaluation as an on-going process
B. Staff for post-training diagnosis and placement
C. Administrative staff with expertise in long-range program evaluation.

Rationale for Selecting a Systems Approach

The consortium has chosen to utilize elements of both off-the-job and on-the-job training approaches in the development of a broader systems approach. This training system incorporates the criteria and constraints of individual instruction. It contains four subsystems: diagnosis and evaluation, training, placement, and a management process control which coordinates the other subsystems through supervisory computerized operation and continuous internal evaluation.

An educational system is defined as learning activities integrated in a way that will maximize the information processing capability of the individual learners. These activities are subject to many constraints such as time, money, specific performance requirements, etc. It is necessary to predict the outcomes of the various alternative learning situations so that meaningful activities can be selected. After the results of selected activities are observed, outcomes may be analyzed for future use in improving educational practice. The interaction of learners with other people and materials in structured educational activities forms an educational system.

An educational system engages learners in activities to provide these learners with increased capabilities (e.g., RDD&E skills). The educational system also must increase its own effectiveness. An educational system includes elements, activities, outcomes (or objectives), information processing, external environment, improvement, and educational catalysts. Figure 2 is a pictorial representation of an educational system.

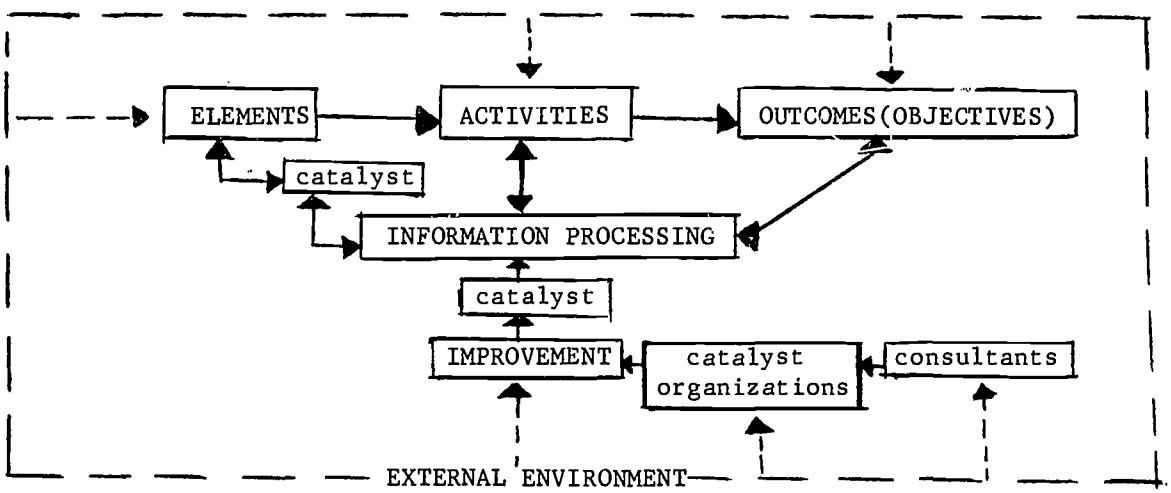


FIGURE 2

Elements are comprised of learners, teachers, administrators, parents, and the books, buildings, films, and other materials pertaining to the educational system.

Activities consist of all the relevant, describable actions in which elements can engage. Such activities as reading, writing, inquiring, discussing, etc. are carried out by the elements.

The educational system has outcomes or objectives which it endeavors to attain. When the elements engage in activities, the results are outcomes which may or may not match the specified objectives. The more clearly the objectives are described, the easier it is to determine the extent to which the outcomes meet the objectives.

The information processing components are contained in a subsystem for storage, retrieval, and analysis of information. This subsystem includes the predictions that are required to estimate the effects of alternative activities, the consideration of constraints under which decisions must be made, and the choices to be made from many alternatives (the decision-making process). It also includes the comparison of actual outcomes with desired and predicted outcomes, providing feedback for controlling and improving the system.

The external environment operates outside of the educational system, but influences it at all important stages. It comprises everything that influences or interacts with the educational system, including funding sources, consultants, R & D centers, pressure groups, and other individuals and organizations, both inside and outside the field of education.

Improvement in an educational system may be generated by employees, students, or trainees, or it may come through pressure from an outside agency or group. Typical improvement activities include reorganization of the elements and activities, cost-benefit analysis and staff training.

The educational catalyst must cause interaction between the human elements of the operational system, its improvement component, and the external environment, in order to accelerate the improvement of training. The catalyst function may be performed by one person interacting in several different ways, or by several persons focusing on a specific situation.

Specifically, the training of RDD&E personnel involves an educational system with all of the elements of the preceding discussion. Particular emphasis is placed on the importance of information processing within such a system. It is also necessary to have appropriate information about personnel, activities, and outcomes.

The training of RDD&E personnel, as envisaged by the consortium members, is described by the preceding system. The training of individuals will take the form of increasing one's information processing capacities. The systems approach also underlies the design for operationalizing a training program for RDD&E personnel.

TRAINING SYSTEM

Training

Before discussing the RDD&E training system, it would be advantageous to review the concept of training. This review will provide the philosophical foundation for the proposed training system combined with an examination of developmental design to date.

The term "training" is a word applied in broad areas of instructional processes. A process implies an ordering of parts in a systematic schema. According to Glaser (1962) in Training Research and Education, training concerns the techniques and procedures for guiding and modifying human behavior. Further, the purpose of a training system is to create the conditions that cause behavior to be modified. The practical task is to perform certain operations that result in definable changes according to specified instructional objectives.

Education is also, in general terms, an instructional process. Training may be one way in which that process occurs by teaching students to perform similar or uniform behaviors. The educational component is the development of individual differences between students. The distinction between training and education, Glaser (1962) notes, depends on two factors: (a) specifying behavioral end-products, and (b) minimizing versus maximizing individual differences. "The underlying similarity between training and education is that both develop or form by systematic instruction" (Glaser, 1962, p. 5).

A basic instructional system for training has been proposed by many researchers such as Bernard Bass (1960), R.M. Gagne (1962), and others. Essentially, the system consists of five components: (a) research and development methodology; (b) instructional objectives; (c) entering behavior; (d) instructional procedures; and (e) performance assessment. The application of the system (or variants of it), via operational objectives, requires a concise methodological framework composed of functions derived from a task analysis in whatever context the system is implemented. Four educational functions heretofore receiving little training-design attention form the context of the system. Presently, there are areas of education which do not have available personnel with appropriate training for the tasks involved. Among these are research, development, diffusion, and evaluation.

Prior to the passage of the Elementary and Secondary Education Act of 1965, training of researchers for education was in a relatively crude state. In the early 1960's both Griffiths (1959) and Fattu (1960) found that the number of personnel involved in educational research and research-related activities was very small. Both studies also suggested that the research produced by these individuals had little impact on the behavior of professionals in the field and added very little to the field of education as a whole. Bushwell (1966) and Sieber (1966) confirmed these findings. Bushwell found the educational research field was composed of fragmented, small-scale research projects, and that nearly one-third of 818 education doctorates received in 1954 had no research publication.

Further studies by Barger (1965) and Hopkins and Clark (1969) confirmed that RDD&E personnel were engaged primarily in individualistic research, usually as part-time functionaries. New researchers, probably not more than one of ten doctoral graduates, had little input into the field of education. Further, most research was centered in university settings, and this primarily took place in ten to twenty universities offering doctorates in education. The field of education was inhabited chiefly by researchers with a background in psychology or educational psychology; and most research was not central to the operation of elementary and secondary schools. Hopkins and Clark (1969), in their comprehensive review of RDD&E personnel, found that (a) graduate programs in professional education had been heavily "service-practitioner-oriented" and had placed little emphasis on research training; (b) doctoral graduates in the field of education had produced little scholarly and research material; and (c) social and behavioral scientists (with the exception of those in psychology) had little interest in educational research. The purpose of ESEA, therefore, was to develop a community of researchers, developers, and disseminators who could relate research directly to the needs and interests of the public schools.

Despite new funding, however, the years immediately following the passage of the Elementary and Secondary Education Act found the preponderance of RDD&E personnel still located in college and university settings, functioning primarily as individual researchers, most of whom were still employed in a part-time capacity. Sieber (1968), in a study of USOE training programs, verified the university-based orientation of RDD&E training. Criticism of existing programs under the

Office of Education were primarily these:

1. Lack of program objectives
2. Failure to adapt to pressing demands
3. Little training of new role types
4. Lack of support for portable training methods to meet increased personnel needs
5. Failure to encourage innovative methods for training RDD&E personnel (Hanna, 1970)

The inadequacy of existing programs was in large part due to the enormous increase in demands for trained RDD&E personnel. Hopkins (1969) suggests that changing employment patterns require large numbers of RDD&E personnel on a full-time basis; R & D centers, national laboratories, ERIC Clearinghouses, and other comparable program units, for example, are unable to function with part-time personnel. The shortage is severe enough in 1970, the author suggests, that existing personnel will have to act as generalists. The overwhelming demand and a sharply-limited supply of trained RDD&E personnel might well delay the pursuit of solutions for an extended time unless innovative attempts are made to correct the discrepancy between supply and demand.

Moreover, traditional methods of preparing individuals for educational research and research-related work still reside in colleges of education. Training outside of this format is usually informal and restricted primarily to on-the-job experience. Traditional training centers and other universities, for example, produced 200 - 250 trained researchers in 1969; curtailment of funds for ESEA Title IV research training programs prevented a doubling or even tripling of this supply. New development and diffusion roles have been ignored by the major training institutions. Although a few universities have conducted short-term training institutes and courses at the sub-

doctoral level for developers and diffusers, the numbers of persons trained under these programs has been "miniscule" (Hopkins, 1969). Hopkins writes:

> In the absence of a concerted national training program of heroic dimensions, R,D, and D agencies will be staffed for an extended period of time with untrained personnel. Until the new employees can be trained, the agencies will be unable to move with precision and sophistication to create imaginative solutions to the problems of American education (p. 585).

It has been established that the demand for trained RDD&E personnel far exceeds the supply and that new modes for training must be designed. One of the most promising approaches to meet this enormous demand for RDD&E personnel is found in the strategy of in-service education. This approach utilizes self-contained, self-instructional units to develop particular skills in needed areas. Once the learner has an understanding of a skill or skills, he could adapt it to the particular needs of a given setting. Use of these self-instructional skill units, could, in the words of Hopkins, "...multiply the productivity of entire classes of professionals who are already on the job full-time, but are unable to produce at a level of resources provided them" (Hopkins, 1969, p. 586).

As discussed previously in this report under the sections on Rationale for a Training Design and Consortium Decisions and Alternative Strategies, the consortium reached three major decisions as it sought to develop a training design. The first focused on a national needs study of existing personnel in research, evaluation, development, and diffusion, and a determination of skill levels. The objective in the needs study was to establish priorities of needs by categories, educational entry levels, and specific skill areas. To complete this task it was necessary to examine existing training programs.

The second major decision point centered on strategy selection. Constraints and alternate strategies were related to priority needs in an effort to select strategies. The national needs study and the constraints defined formed the overall rationale for the training design.

Finally, the third key decision defined and expanded strategies for each skill level. The goals and objectives, criteria, and methodology were specifically related to making the strategies operational. Throughout each decision stage an effort was made to address as many of the priority needs as the research and facilities would allow, realistically. It was necessary to relate the needs to skill areas, rather than to the respective RDD&E functions. Many skill areas overlapped, and of necessity some skills would be developed as by-products of other skill development in training. This decision to address skill areas as opposed to specific RDD&E functions was designed to allow training to be as individually tailored as possible, whether for an agency or a person. The literature research and interview survey clearly established the rationale for this stragegy.

Following these major decisions the consortium considered how to make the strategies for training operational. The training design which ensued resulted from a comprehensive investigation of the types of skills in RDD&E personnel that various institutions and agencies require.

The following will review the theoretical basis for the educational models produced during the context analysis and design stages. In addition, it will expand the more specific requirements of various organizations having a need for RDD&E personnel. Finally, the modular

training design is intended as a solution to the complex problem of meeting these requirements for trained RDD&E personnel.

The educational models produced during the context analysis and design stages have courses and content which are planned to bring students to various levels of capability. The models address students with varying prior training and experience and delineate appropriate educational levels for them in the shortest time and at the lowest possible cost. More than one model may be structured to reach the same goal, placing these models in competition to determine which, in reality, is the best.

The contents of these various courses are structured to accomodate the most critical needs determined during context analysis. The sequence of content presentation varies on the assumption that students will not enter training with the same level of skills and experiences.

All efforts are being made to include the most recent technology and the most innovative techniques, and to encompass any fields necessary to a proper understanding of the skills and specialties being taught. When practical, the training material will be tailored to individually prescribed instruction or other self-teaching devices.

The modular concept will employ varying entry and exit points. Thus, if a student finds it necessary to discontinue training sooner than planned, he will still have acquired a usable skill, even though at a level lower than originally intended. Similarly, a student with some prior training or experience will be able to enter a program at an appropriate level.

Specific emphases of course content will be aimed at providing knowledge and skills in the areas of R,D,D, and E. These functions

and skills will provide a knowledge-base for attacking the most pressing educational problems in a number of settings. Mobility of training will further enhance content by providing a program that can be established, administered, and evaluated in a short time, in locales where such skills are urgently needed. In addition to developing and enhancing research and research-related skills, content will include instruction about various cultures and various levels of living; examination of relationships between the academic world and the larger community; explorations of human relations; teaching methods; and, the effects of poverty and deprivation. Trainees will also be taught about development of educational products and methods with emphasis on systems approach and analysis, the processes of change, the aspects of self-improvement, and the elements of planning and management.

The training consortium has sought to make course content broad-based. Pre-training diagnosis will be used to select those courses most appropriate for the trainee, determined by both his entry skills and the post-training skills desired by his agency. As elaborated, these ideas form the general theoretical framework from which the more specific requirements of agencies desiring RDD&E personnel were examined. The following is a more detailed analysis of the needs of these institutions as they directly relate to skill areas.

There is an increased demand for several kinds of educational functions to be performed at public school levels. As the number of new products and other innovations increases, it becomes more and more difficult for each school to determine which of these to adopt. In addition, there are programs, materials, and psychometric techniques that might require application or evaluation. Therefore,

schools and districts need evaluators and innovators in ever-increasing numbers who can relate problems to solutions and then properly plan and manage the installation of some innovative device or method to facilitate the solution.

Regional development laboratories and research and development centers are experiencing difficulty in finding personnel who are sufficiently trained and experienced not only in education but in planning and management as well. Bringing these two skills together requires additional emphasis. These same institutions, as educational research expands, will demand more and more personnel to handle diffusion and evaluation tasks.

Colleges of education in the university setting are having difficulty in finding experienced personnel to conduct the kinds of research and investigations that their programs require. As previously noted in this report, traditional methods of training RDD&E personnel are not effective and are not producing sufficient numbers of qualified, employable personnel.

Educational corporations, or educational-related businesses, are also demanding RDD&E personnel not only to work with developing their own programs or specialties, but also to expand the scope of their concerns while maintaining levels of information on new research findings or methodologies.

In reviewing these and other requirements, it appears that there is a requirement for skilled personnel throughout the educational spectrum, from those who are highly specialized, with relatively little formal education, to those who have full graduate degrees in several disciplines. It is anticipated that training and educating persons

to serve the various needs of this continuum will be accomplished by several different modes.

The less complex requirements can be met by conducting vocational training through the use of minicourses or models of specific training; whereas at the other end of the continuum training and education will be required from an established university with appropriate accreditation.

Certainly, all personnel will be trained to some specific level of skill, and competencies must be produced in admixtures of skills to accomodate the ever-increasing and ever-more complex requirements of RDD&E functions in education.

Some of the positions which need to be filled do not necessarily require a formal educational foundation, but can be filled adequately by cross-training experienced persons from other career fields in appropriate educational know-how. In other words, it will be far less expensive and time-consuming to cross-train an experienced planner, researcher, or management person from some other field in education than it would be to train a person completely, both in general educational principles and in some specialized educational function. Such a process would expedite closing the gap between demand for RDD&E personnel and their supply.

Further, the consortium has taken note of the visible absence of minority persons in the educational research and research-related fields. Such training as the consortium proposes would serve as an immediate vehicle to train ethnic and racial minority individuals from a variety of settings and to place them directly into the RDD&E market. Such trained personnel, through evaluation and feedback,

could then aid in the redesign and implementation of programs with particular sensitivity to the needs and requirements of minority persons. This process in turn would help meet the demands for such personnel in both the private and public educational sectors.

The consortium has embraced these principles along with the concept of unit or modular training. The opportunity for developing many inexpensive solutions exists; the use of these solutions in terms of actual numbers to be trained will vary according to the needs to be filled. Specific needs, as discussed earlier, have been determined by the consortium during their context analysis work. The experience of the consortium members has indicated broad needs for educational evaluation specialists and education communications specialists of several types.

The training models, when tried out and tested in the operational phase, will have nationwide utility. The design of the training program encompasses widespread usage and the replication of training packages with broad application.

Skill Areas Critically Needed for RDD&E Personnel

A review of the efforts by the American Educational Research Association Task Force on Training Research and Research-Related Personnel in Education reveals a number of skill areas that are necessary for research and research-related activities. The AERA Task Force Papers (Numbers 1,2 & 3; Worthen & Gagne, 1969; Worthen & Sanders, 1970; Sanders & Worthen, 1970) report that from the skill lists developed by this group a number of superordinate areas of skills can be defined. The areas comprise a methodological basis for a training program.

The following delineation of skill groupings illustrates the high need, low availability areas for which this training program is being designed. The seven general areas (excluding orientation modules) have been determined on the basis of skills presented in the AERA Task Force Report Number 3 by Sanders and Worthen, University of Colorado. The AERA "working papers" contain skills distributed under general categories of RDD&E.

Because the training system focuses on individual needs to the extent plausible, it was necessary to combine areas in which skills overlapped, whether they were research skills or diffusions skills. After identifying partial or whole duplications, the skills were grouped under general headings which defined the kind of training function and activity involved in a design. An RDD&E grouping follows below. Seven areas can be defined which would encompass 96 percent of the skills denoted in the AERA Force reports. These are:

1. Conceptualization of issues and processes in education
2. Designing techniques to carry out educational goals
3. Setting educational objectives
4. Measuring and evaluating educational objectives
5. Summarizing and communicating outcomes
6. Implementing outcomes
7. Identifying and incorporating attitudes, values, and practices of minority groups in the educational process

The training staff, under the guidance and direction of the consortium, has delineated a course content that would train individuals in the above skill areas. The training program as defined now would contain a number of modular course packages that would allow for the individualization of any trainee's instruction based upon his occupational specialization and his previous background and

abilities. The specific content of the modular areas are presented in Volume II of the Final Report.

Each training module will contain two training elements. The first element is specific content that the individual requires to be able to master the skills involved. The second contains practical exercises that would give control-practice to the individual. These exercises will be of a number of different types, including checklists, work sheets, simulated activities, small group interactions, and problems that can be carried out as part of one's job. Evaluation of the student's performance will be of three types:

1. Self-evaluation
2. Evaluation by the training staff through written communication
3. Evaluation by supervisory personnel at the agency

The content and skill training aspects of the proposed training system will call for extensive individualization for each trainee, allow him to continue in his paid professional endeavors while increasing his conceptual knowledge and skills.

Modular Training Design

After defining the skill areas, the consortium members identified the major components or subsystems that would be part of any viable training system. These subsystems are:

1. Diagnosis
2. Training
3. Placement
4. Management

Further, it was necessary to define the characteristics of the individuals to be trained before any more detailed specifications of the training system could occur. Consortium representatives agreed that individuals from two different experiential backgrounds would be trained: (1) advanced undergraduate and graduate students currently engaged in the pursuit of academic degrees, and (2) individuals from agencies who could benefit from additional training to better fulfill their current or future job requirements. The types of agencies that were identified as being the most probable users of training are:

1. Local school districts
2. State departments of education
3. Regional service centers
4. R & D centers and laboratories
5. Colleges and universities
6. Private and other agencies

The consortium representatives also agreed that the training should include components that could be used by managerial-administrative level individuals in agencies to provide a broad orientation to the research and development process. In the section "Criteria to Implement Selected Strategies," there is a detailed list of these guidelines.

Figure 3, "Individual Structure Training System," shows in graphic

form the training system with its four subsystems. This system would allow individuals from either university or agency settings to be diagnosed relative to their strengths, weaknesses, and future goals. The individual would then have a series of modularized courses combined in a unique pattern which would be completed while he was still involved in his current course of study or job tasks. After completing a certain number of courses, the trainee would spend from one to twelve months in an internship in which the skills he had previously learned, together with the newly acquired skills, would be put into use in a controlled environment. Upon completion of the internship, the individual would be able to return to his agency or enter into the employment market with a much higher degree of competence than would have been possible prior to this training. The complexity of this type of system requires that a management subsystem be developed to monitor the flow of individuals through the training process.

The characteristics of each subsystem are:

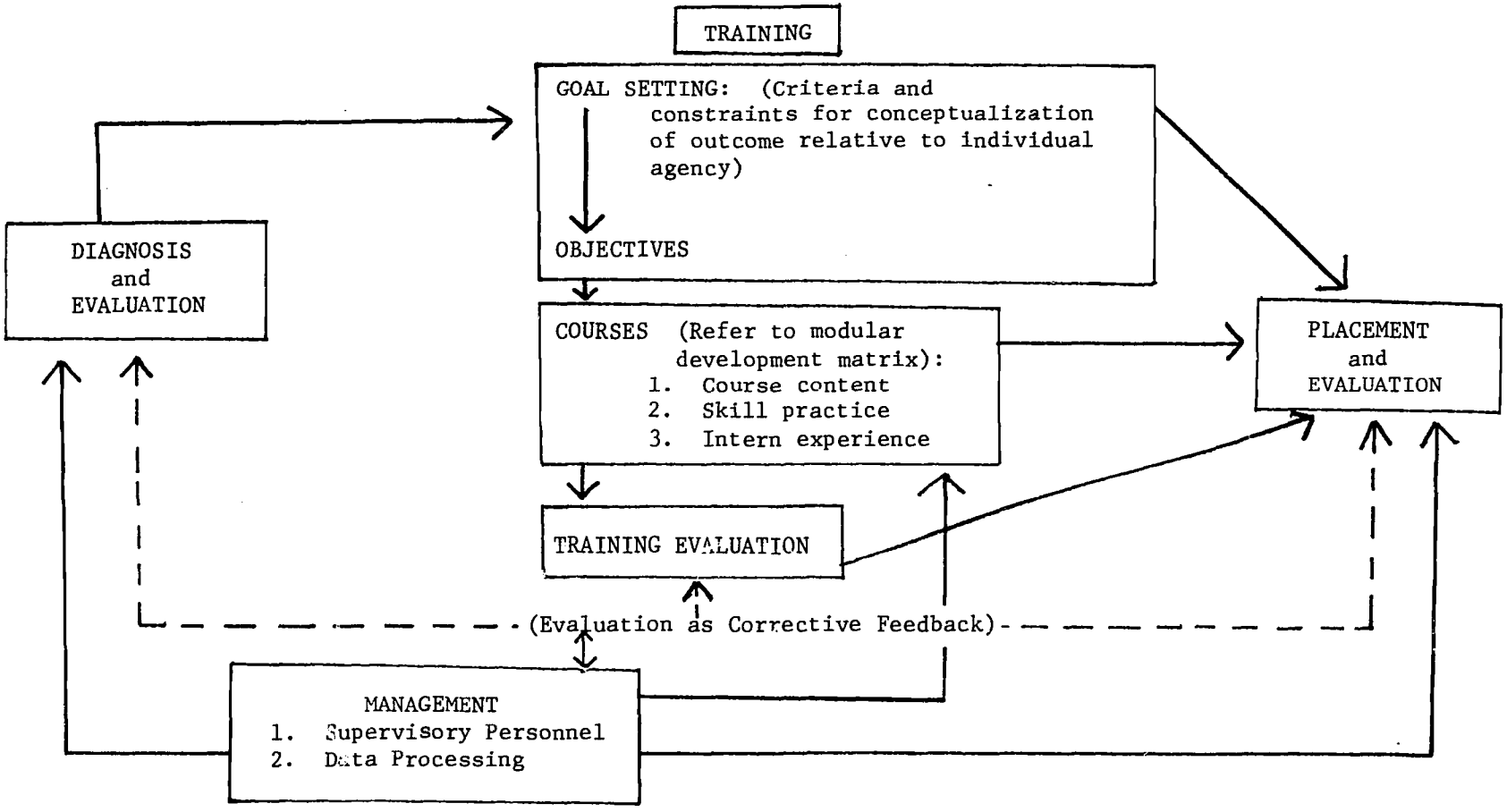
1. Diagnostic Subsystem: This subsystem would view the individuals together with institutional suggestions in regard to needed skills. Through counseling and testing, it would determine the ability levels of the individual, his strengths and weaknesses, and to a certain degree his motivation. Ideally, a long-range goal would be a diagnostic profile that would follow each individual through his training and would identify areas of need concentration. Part of the diagnostic subsystem task would be to evaluate individuals on their ability, motivation, and performance, and to counsel them concerning their future in the program. The individual's training potential at specific modular stages would be evaluated by coordinating his diagnostic profile with a skill development test given at a respective point in his training program.

2. Training Subsystem: This subsystem involves three separate but related steps. The first takes the information from the diagnostic subsystem and sets individual goals to specify what courses or portions of courses a trainee should take. Goals for the individual are translated into the second step, specification of instructional objectives, which are abstracted from the modular courses. The courses at this point are conceptualized to be any framework such as that shown in Figure 4, "Exemplary Training Module Structure for Skill Development." These courses

FIGURE 3

INDIVIDUAL STRUCTURE
TRAINING SYSTEM

Four Subsystems to Define, Structure, and Operationalize the Training Program



would have three aspects of training: content based on routine materials such as video tapes, audio tapes, and lectures; practice of course skills by program material, micro-teaching, situational simulation, and small group interactions (the main focus being to give the trainee specific practice and critical feedback on his ability to transpose content into application); and an unstructured internship experience in which the skills are applied in actual situations.

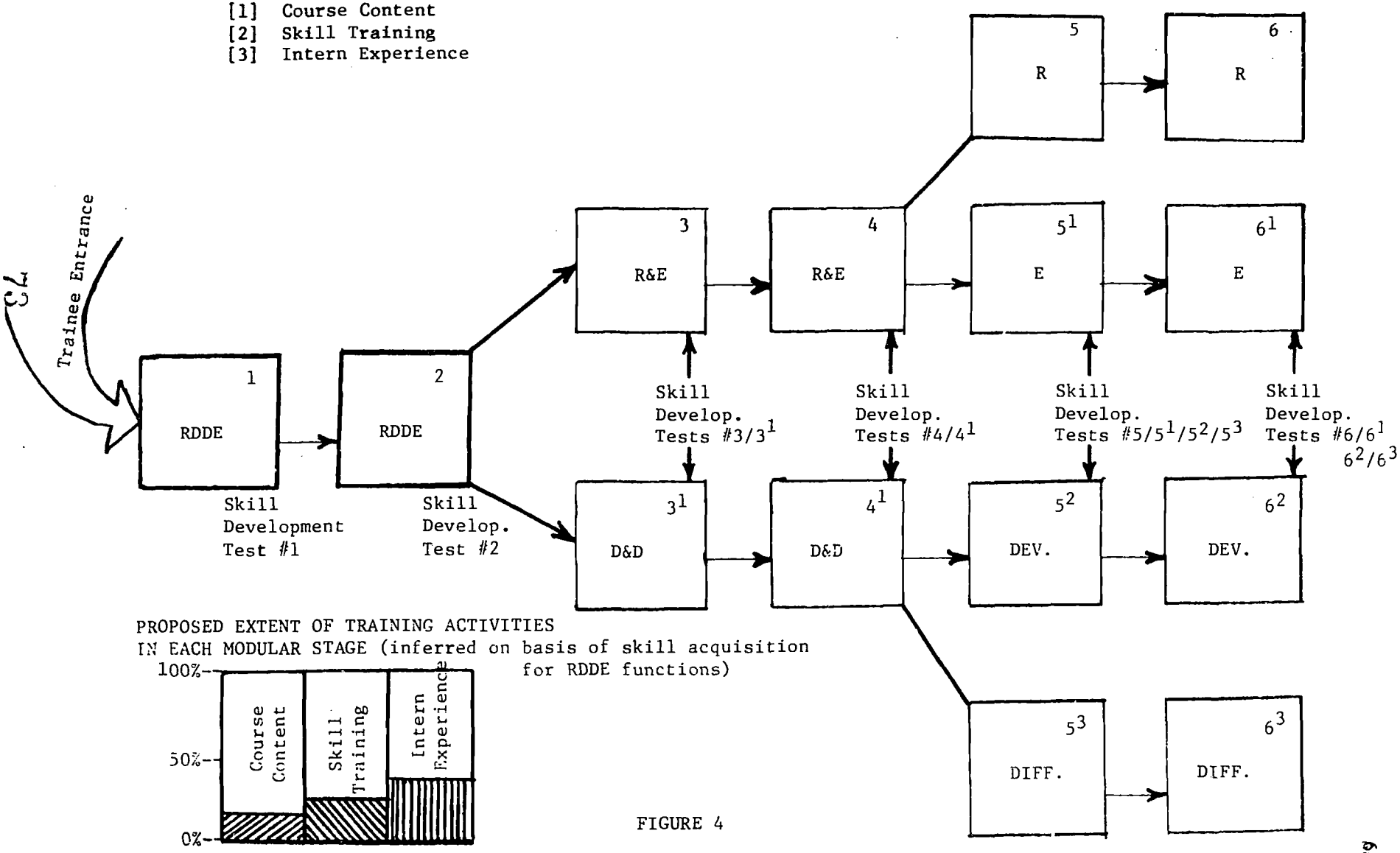
3. Placement Subsystem: This subsystem would place college trainees in appropriate institutions and carry out follow-up evaluations of the performance of all graduates. This evaluation of the trainee's performance would serve as a feedback mechanism through which the training subsystem could then be modified, if necessary.

4. Management Subsystem: This subsystem would become crucial in coordinating each of the above subsystems. It would provide supervisory personnel, and when this program becomes operational, it would provide computer feedback and continuous monitoring of each trainee and all subsystems.

From the above conceptualization of the training system and its subsystems, the consortium representatives divided themselves into a number of task forces. The four task forces determined what kinds of components would best make this training system operational. The task forces reported back to the consortium, and it was agreed that the following components for each subsystem be developed. (See Figure 3.)

Figure 4 illustrates the composition of a training module and the module developmental relation with the other modules in the Training Subsystem. The internship portion of a module would occur summarily after course content and skill practice were given. These three modular elements comprise 100 percent of an individual module.

MODULE CONSISTS OF:
[1] Course Content
[2] Skill Training
[3] Intern Experience



PROPOSED EXTENT OF TRAINING ACTIVITIES
IN EACH MODULAR STAGE (inferred on basis of skill acquisition for RDDE functions)

FIGURE 4

EXEMPLARY TRAINING MODULE STRUCTURE FOR SKILL DEVELOPMENT

Diagnostic Subsystem

The diagnostic subsystem has two functions. The first major function is to assist any agency in determining its goals and personnel needs. Further, it helps the agency identify the needs and goals of individuals both inside and outside the organization. Its second function is to carry out an individual diagnosis of the trainee in regard to (a) his interests and aspirations, (b) his formal and informal educational background, and (c) his current level of competency in the skills identified as needed by the agency.

Components of the Diagnostic Subsystem To Be Developed

1. Agency Interview (Policy)
2. Agency Interview (Supervisor)
3. Agency Questionnaire
4. Agency Need Checklist
5. Individual Interview
   a. background
   b. goals (career)
   c. perceived training needs
6. Diagnostic Tests
   a. orientation to RDD&E
   b. conceptualization of issues and processes in education
   c. designing techniques to carry out educational goals
   d. setting educational objectives
   e. measuring and evaluating educational objectives
   f. summarizing and communicating outcomes
   g. implementing outcomes
   h. identifying and incorporating attitudes, values, and practices of minority groups in the educational process
7. Individual Need Checklist

Training Subsystem

The training subsystem has three functions. The first is to take the diagnostic information and develop an individualized course structure based on the individual's needs and the agency's goals. It will build an individual course of instruction from the training package. The second function is to have a wide range of training materials that can be used to fulfill the needs of the individuals and agencies. Specifically, the consortium proposes to build modularized packages in eight areas. These areas, the rationale for their development, and their modular content were discussed earlier under the section on training. An example of this modularized structure is:

(1) Some definitions related to RDD&E (2) The R&D process a. History b. What it means (3) Applications of the R&D process (4) Guided tour through an application of R&D (5) Review	Module I.
(6) Analyzing your staff for R&D usage (who) (7) Training for R&D staff members (what, where, how) (8) Utilization of R&D staff to answer questions a. Questions b. Procedures c. Answers d. Application of answers for decision-making e. Implementation of answers (9) Review	Module II.
(10) Simulated problems to evaluate 1-9	Module III.

Each of the modular components is a self-contained training unit. These units will involve no lecturing or group instruction, but rather will be used by an individual at his own place of employment or study.

The third major function is to provide individualized types of internship experiences. An individual, after completing the modularized training units identified to fulfill his skill needs, will go to an agency selected as being compatible with the trainee's goals. Here he will complete the training process. Internship experiences will last anywhere from one to 12 month depending on (a) the complexity of the skills involved, (b) the needs and resources of the agency, and (c) previous training and experience of the individual trainee. These internship experiences would be different from the current educational internships in that the diagnostic information would be available to the internship supervisor. In addition, the skills of the trainee would be assessed by performance tests and specific guidelines of the internship based on the needs of the agency. These would be developed by the training staff.

Components of the Training Subsystem
To Be Developed

1. Goal Setting Checklist
   a. list of agency needs
   b. list of individual needs
   c. placement scores on diagnostic tests
   d. identification of objectives to be met

2. Training Packages
   a. orientation to RDD&E
   b. conceptualization of issues and processes in education
   c. designing techniques to carry out educational goals
   d. setting educational objectives
   e. measuring and evaluating educational objectives
   f. summarizing and communicating outcomes
   g. implementing outcomes
   h. identifying and incorporating attitudes, values, and practices of minority groups in the educational process

3. Internship Experiences
   a. basic research internship
   b. applied research internship
   c. development internship
   d. diffusion internship
   e. evaluation internship

4. Summary Report Form for Agency
   a. list of skills developed
   b. performance on post tests and internships

Management Subsystem

The management subsystem has three major functions. The purpose of this subsystem is to store all information that is pertinent to the training process of any individual trainee. This information includes (a) diagnostic information, (b) individual performance information, (c) internship evaluations, and (d) evaluations based on performance after the trainee has returned to employment. A second function of the management subsystem is the storage of all evaluative information on each component, each subsystem, and the overall training program. The third function of the management system is to monitor, by means of computer program, the progress of each individual student as he proceeds through the training process. A majority of all the management subsystem components will be computer programs initially developed for the University of Texas's CDC 6600 computer, by the Santa Clara County Center for Planning and Evaluation.

Components of the Management Subsystem

To Be Developed

1. Computer program
   a. agency and individual diagnosis
   b. follow-up evaluation information
2. Checking program to monitor progress of individual student

The following figure illustrates the relationship of the management subsystem to the components of the other subsystems.

CORRELATION OF RDD&E SKILLS
with
Diagnostic Placement Test, Interviewing Instrument, Modular Test Skills,
and
Internship Diagnostic Test

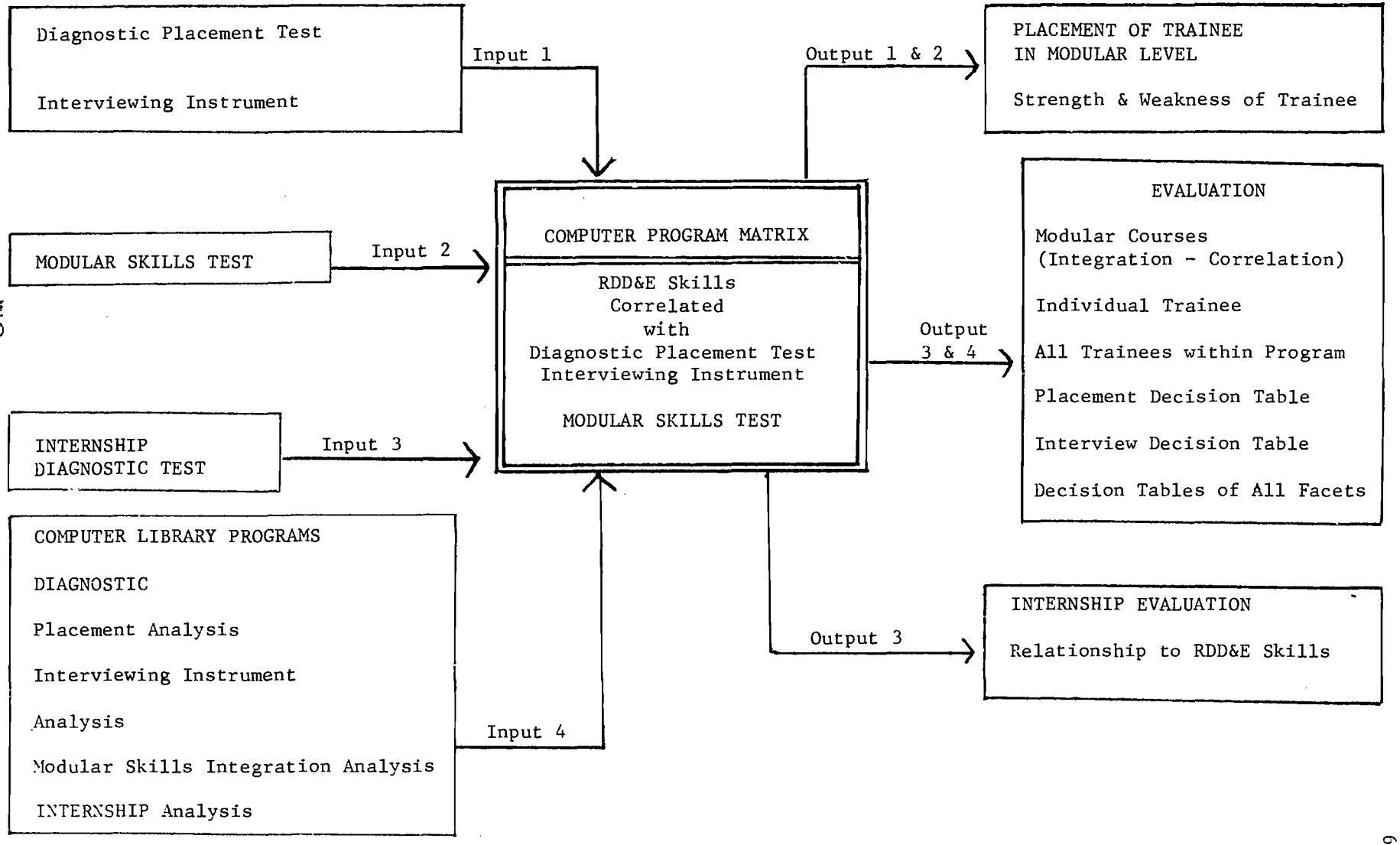


FIGURE 5

Placement Subsystem

The primary functions of the placement subsystem will be to secure employment for the trainee upon his completion of the various training packages and to retain all information pertinent to internship sites and agency sites for the trainee. In addition, it will provide evaluation forms for the supervisors of trainees on the job and for the trainee himself. By maintaining files on (1) agencies and institutions interested in the trainees, (2) trainees who complete the program, and (3) internship sites, the placement subsystem will coordinate the activities of the trainee as he leaves training and is placed within a particular agency. The agency in turn will have an opportunity, through evaluation procedures to provide input and suggestions for the training program based upon the performance of the various trainees.

Components of the Placement Subsystem
To Be Developed

1. File of agencies and institutions interested in trainees
2. File of trainees who completed the program
3. File of internship sites
4. Evaluation forms
   a. supervisors of trainee
   b. trainee

CRITERIA TO IMPLEMENT SELECTED STRATEGIES

1. Training program will consist of four phases of operation:

   Year 1 - Feasibility Phase
   Year 2 - Pilot Phase
   Year 3 - Field Test Phase
   Year 4 - Diffusion Phase (Year 4 is the final six months of a period of forty-two months).

2. Focal agencies for training will be (by type):

	percent of directed effort
School districts	30
State departments of education	15
Regional service centers	15
R & D centers, laboratories	15
Colleges and universities	15
Private agencies (primarily engaged in RDD&E activities)	10

3. Focal individuals within the above agencies will be:

	percent of effort	
	Currently employed	Committed to be employed
Top management	10	0
RDD&E - College graduates (BA - post-doctoral)	30	30
RDD&E - No degree	20	10

4. Numbers and types of individuals trained over three years:

   (See Figure 6)

FIGURE 6

Training Program Development - By Year and Participating Agency

TYPE OF AGENCY	YEAR 1 Product Design	YEAR 2 Pilot Test	YEAR 3 Field Test
Local School Districts	Austin ISD - 50 trainee participants	Austin ISD - 5 trainee participants	Austin ISD - 5 trainee participants
State Departments of Education	Texas Education Agency - 100 trainee participants	TEA - 5 trainee participants Pennsylvania State Dept. of Ed. - 5 trainee participants	TEA - 10 trainee participants Penn. State Dept.- 5 trainee participants
Regional Service Centers	Region XIII ESC - 25 trainee participants	Region XIII ESC - 5 trainee participants	Region XIII ESC - 5 trainee participants
R & D Centers and Laboratories	SEDL - 100 (eval.) trainee participants UT R&D Center - 100 trainee participants	SEDL - 25 (in-house) trainee participants UT R&D Center - 20 trainee participants	SEDL - 15 trainee participants UT R&D Center - 10 trainee participants
Colleges and Universities	University of Texas - 100 trainee participants Louisiana State U. -100 trainee participants Arizona State U. - 100 trainee participants Brigham Young U. - 50 trainee participants	UT - 20 trainee participants LSU - 20 trainee participants ASU - 20 trainee participants BYU - 10 trainee participants	UT - 10 trainee participants LSU - 10 trainee participants ASU - 10 trainee participants BYU - 10 trainee participants
Private and other Agencies	Educational Development Corp. - 25 trainee participants	EDC - 5 trainee participants Human Development Institute - 5 trainee part	EDC - 5 trainee participants HDI - 5 trainee participants
TOTALS	650 trainee part.	145 trainee part.	100 Outside Agency 225 In-house

5. Training will be based on the following geographical considerations during the three years of the development:

   Phase 1 - Use of Consortium institutions as training sites (Texas and Louisiana)
   Phase 2 - Use of 50 percent Consortium agencies, 50 percent agencies selected nationally on a basis of quality programs
   Phase 3 - Use of only nationwide agencies, and use of year 2 sites as internship facilities

6. Participants will be involved in the areas of RDD&E (as defined by the sending agency).

7. Persons performing RDD&E functions at a level which is equivalent to performance by college degree persons will be eligible for training (see Figure 7).

8. Management executives of participants will be accepted for certain types of training (awareness programs) (see Figure 7).

9. Inexperienced college graduates with a commitment for employment or internship in RDD&E will be eligible for training (see Figure 7).

10. All participants must show evidence of a high possibility for success (in RDD&E) from their incoming diagnosis (see Figure 7).

11. Criteria for selection should be two dimensional -- characteristics of persons relative to agency requirements.

12. Participation should be geographically representative of the nation (Phase 3 -- 3rd year only). See Figure 7.

13. Each participant will be scheduled in man-hours of training (refer to Figure 6, "Training Program Development - By Year and Participating Agency").

14. The training consortium will identify exactly what the individual's need is or what type of skill is required to meet the need if the requesting agency or individual cannot do so.

15. In order to assist an agency that had requested service, the diagnostic team will need the following written preliminary information for the agency:

    A. Needs of the agency
    B. The program in which the agency is involved
    C. The skills required to execute the program

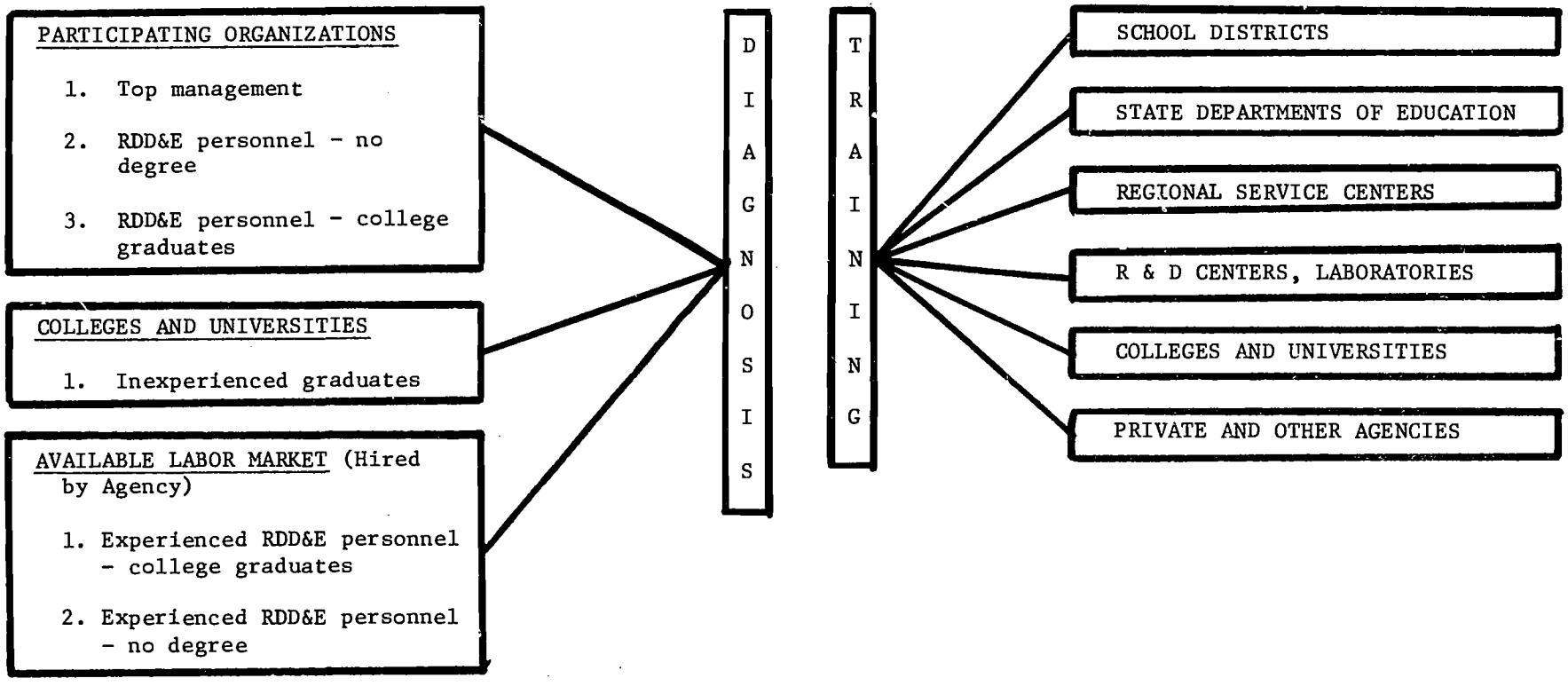

PARTICIPATING ORGANIZATIONS
1. Top management
2. RDD&E personnel - no degree
3. RDD&E personnel - college graduates
COLLEGES AND UNIVERSITIES
1. Inexperienced graduates
AVAILABLE LABOR MARKET (Hired by Agency)
1. Experienced RDD&E personnel - college graduates
2. Experienced RDD&E personnel - no degree
DIAGNOSIS
TRAINING
SCHOOL DISTRICTS
STATE DEPARTMENTS OF EDUCATION
REGIONAL SERVICE CENTERS
R & D CENTERS, LABORATORIES
COLLEGES AND UNIVERSITIES
PRIVATE AND OTHER AGENCIES

FIGURE 7

16. Requests to the training consortium from a public school for service will at least involve the following diagnostic strategies:

    A. Interviewing the superintendent or other person(s) making request (a personal interview is desirable).
    B. Securing information about the objectives of his program.
    C. Determining what the requesting official really wants.

17. The training consortium will use key staff interviews to:

    A. Identify key personnel with whom to talk in order to secure additional information.
    B. Determine techniques to be used in securing needed information.
    C. Identify problem after interpretation of data collected -- the nature of the problem will determine future action.

18. Formal review will be carried out by the training consortium before the personnel diagnosis in order to:

    A. Review alternative approaches with requesting agency.
    B. Describe in detail the skills needed, based on the needs identified.
    C. Assess the availability of skills within the requesting agency. This assessment will be accomplished through various types of diagnosis strategies. Objective diagnostic tests must be developed based upon the descriptions of the specific skills, i.e., criterion reference tests need to be developed for the assessment of the skills which individuals possess. These tests should yield a profile of an individual's strengths and weaknesses in the skill area.

19. The training process will utilize a profile approach in diagnosis. During training an individual's achievement or predicted future success at any stage will be determined by coordinating the diagnostic profile with skill development tests given after each module.

20. Skill <u>groups</u> are based on national needs.

21. Skill <u>areas</u> drawn from skill <u>groups</u> are:

    A. Conceptualization of issues and processes in education
    B. Designing techniques to carry out educational goals
    C. Setting educational objectives

D. Measuring and evaluating educational objectives
E. Summarizing and communicating outcomes
F. Implementing outcomes
G. Identifying and incorporating attitudes, values, and practices of minority groups in the educational process

22. Orientation to RDD&E will precede skill areas as an introductory training module. Examples:

A. Some definitions related to RDD &E
B. The R & D process
    1. History
    2. What it means
C. Applications of the R & D process
D. Guided tour through an application of R & D
E. Review

MODULE I

F. Analyzing your staff for R & D usage (who)
G. Training for R & D staff members (what, where, how)
H. Utilization of R & D staff to answer questions
    1. Questions
    2. Procedures
    3. Answers
    4. Application of answers for decision-making
    5. Implementation of answers
I. Review

MODULE II

J. Simulated problems to evaluate A-I

MODULE III

23. A section of each skill area will exist on the proper identification and use of consultants within the competencies of each skill area.

24. Three steps of specification in training development, from general to specific, are:

A. Skill Area - this is defined as a general area of competency. The skill areas under attack in this project are items one through seven listed in statement 21 above.
B. Module - the second level of specification is a module which would be one of a series of functional training units forming part of the skill area.

C. Skill - this level would be a specific unit of training that, taken with all other skills in the skill area, would be adjedged when held by a single individual as making up competency in that area. For example, psychometric and other procedures for evaluation would be a skill area. Writing an interview schedule might well be a module, while writing open-ended questions for use in the individual interview schedule might be a skill.

25. The training consortium will maintain a placement file for employment; the placement office is the contact between employer and student desiring employment.

26. The training consortium will maintain contact with such professional groups as TSTA and AERA, who also keep information on potential workers for instant retrieval to be contacted by employers.

27. Regarding placement, an interrelationship exists between training and placement agencies which allows trainees to perform real tasks on minimum (limited) pay with possibility of future employment.

28. The training consortium will make agreements, if so desired, between two agencies for an internship exchange between the two agencies.

29. The training consortium will coordinate two agencies who desire to send one staff member each to an outside training session for possible job exchange between the agencies.

30. The objectives of the management control subsystem are:

    A. Coordinate the various subsystems through computerized operation.
    B. Integrate the entire training program.
    C. Diagnose the strengths and weaknesses of trainees.
    D. Develop placement system of the individual trainee in the training program.
    E. Continue evaluation of all systems.
    F. Develop procedures for control when system(s) become nationally-spread.

31. Basically, the training consortium will utilize two methods by which individuals will be placed from the training program into the agencies; diagnostic tests and interviews.

32. Within the management control subsystem, the diagnostic test and/or interview for placement of the trainee must be integrated with all modular training programs. Skill development tests within a modular course must be integrated with the entire system.

This integration would accomplish the following:

A. Diagnosis of the strengths and weaknesses of the trainee.
B. Placement of the trainee within a given modular unit within the correct step of the module.
C. Integration of the training of the various modular programs.
D. Constant evaluation of the individual through the development of a simple computer program (along with the matrix).
E. Evaluation of modular tests in relationship to what is being learned by the trainee.
F. Coordination of the various subsystems.
G. Evaluation of every trainee in the program and of the entire program nationally through the development of a training RDD&E Matrix Analyzer with several supporting computer programs.

Developmental Process

The SEDL had evolved a systematic process for the development of educational products. Using this as a basis, the consortium has identified six stages of the development process for producing and testing a replicable model designed to train individuals to meet national and regional needs for RDD&E personnel. The strategy incorporates a design for a portable, flexible, and modular training system to accomplish these needs.

The process description outlines steps within each stage of development. The criteria establish broad guidelines that could apply to any given program. The implication of development according to this model is that cycling would occur within each stage until criteria had been met. The model is not entirely linear. Rather, a design may enter more than one stage simultaneously or it may return to a previous stage for clarification and guidance.

The design of a product does not imply any given time period. In other words, a product might be used as a one-week training program for teachers -- the first week of an inservice training program -- or one year of a curriculum for students. Within a given program, products need to be defined in terms of their scope. The major characteristic of a product is that it is replicable. The flow chart in Figure 9 graphically portrays the cycling that might occur in developmental process. It is expected that a program director, or person responsible for any given stage, would specify criteria as applicable to the products in that stage. These criteria, however, should be consistent with those listed in the following discussion of the development process.

FLOW CHART OF DEVELOPMENT PROCESS

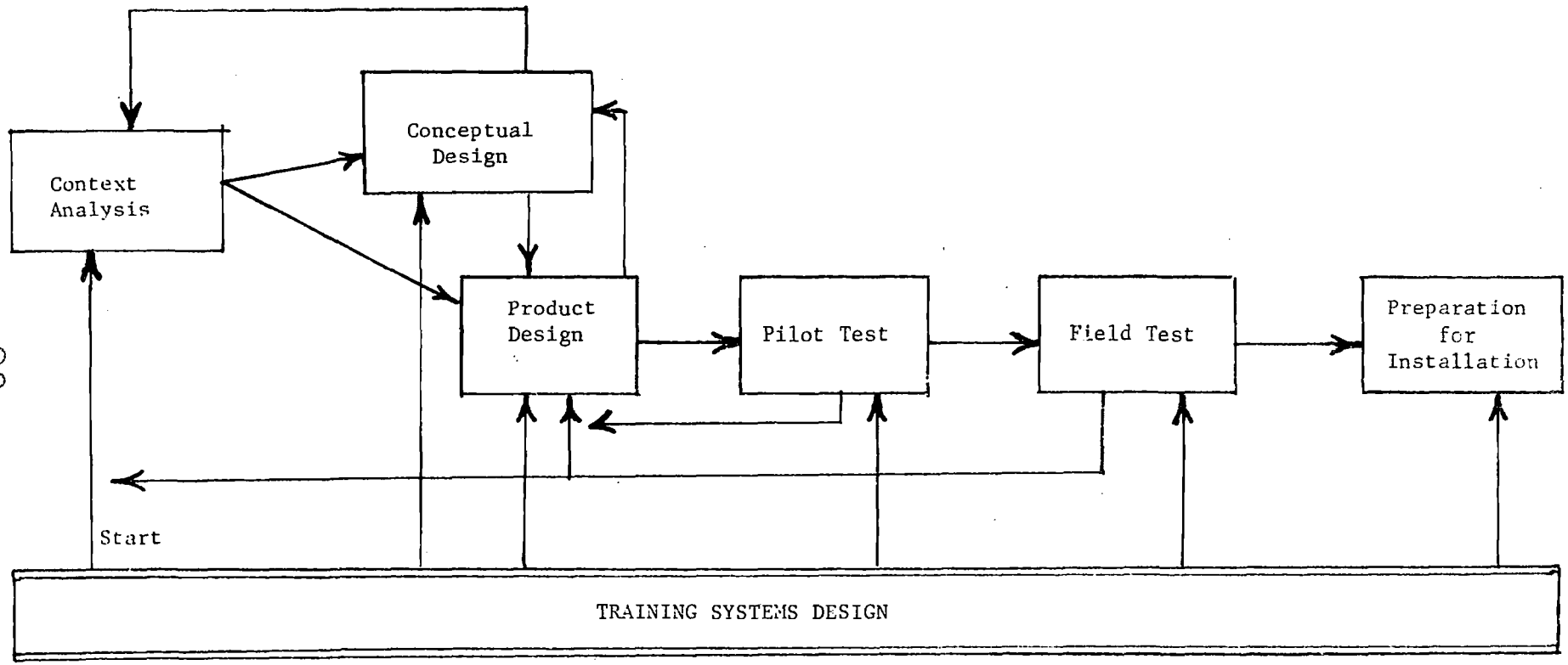


FIGURE 9

Stage I: Context Analysis

First it is necessary to identify the social goal that is not being attained sufficiently, as well as those important factors which affect the attainment of the goal and statements of identification of factors that will be addressed. There should also be identification of alternative strategies and selection of a strategy or general approach to achieve the desired effects. Important criteria are the relevance of the social goal to the problem -- focus of the consortium, empirical support that documents the existence of factors affecting the attainment of these goals, and justification for strategy selection. The outcome of context analysis should be a document setting forth the rationale for the selection of a solution strategy.

Stage II: Conceptual Design

During this stage, the consortium should identify the theoretical framework for the project and document this from research. There should also be identification of components and elements in the training model and descriptions of the scope and sequence of goals for each of the training components. This process should be consistent with the consortium's rationale and scope of activities as well as relevant to the culture and ethnicity of prospective trainees. A document that specifies the training model with appropriate documentation would be the result.

Stage III: Product Design

During this stage the consortium must specify objectives for each component and element of the training model. Clarity of objectives measures for the objectives consistent with the model should be cited, as well as a

designation of activities required to attain the objectives. Replicability of the prototype and specification of materials, equipment, and special arrangements consistent with a unit-cost ratio should be delineated during training activities. Finally, there should be integration of activities into a schedule that allows for sequential development of the program. The outcome would be a prototype product ready for testing.

Stage IV: Pilot Test

Because the pilot test stage involves the actual training of an individual in RDD&E work, their must be a determination of how and when the trainee will be tested. Subject performance outcomes will be specified along with the designation of a feedback evaluation system and a plan for use of the feedback data. A revision system with specified criteria would be applied. A cycle of time for testing should be appropriate to the prototype, and the outcome of the pilot test stage should document the application of criteria and results of the tryouts as well as the revisions that are made prior to the next cycle of testing (if required).

Stage V: Field Test

This stage must specify and implement a plan for more widespread use and tryout of the revised prototype with provisions for comparison with alternative approaches. Criteria to be met are the extent to which performance requirements of the prototype are satisfied, and the extent to which strategy compares favorably with alternatives in terms of the effectiveness, side effects, and costs. The outcomes should be gathered as an evaluation report which specifies the conditions, procedures, and results of the validation report.

Statements of modifications would be made as required.

Stage VI: Preparation for Installation

This final stage identifies and projects the benefits of the training model based on validation reports and existing cost benefit analyses. Benefits are related to costs. The relationship between costs and projected benefits will be delineated. Further means of dissemination must be developed, as well as manuals of installation procedures and requirements. A technical manual that provides for flexibility of arrangement for dissemination and is adequate for widespread use would be developed. This manual would be a part of the marketing capabilities that would grow out of this final stage of development.

Resources

To carry out the detailed design of this training program and make it operational, the consortium has called upon a large number of resource personnel from within the consortium and from outside of it. It would be advantageous at this time to list the individuals available as resource personnel to the consortium. Due to the complexity of the consortium decisions and design process, however, it would be an impossible effort to detail the individual contributions of various resource personnel. Rather, the resource personnel should be thought of as contributing their expertise in a manner to best implement the broad-range goals of the consortium.

The primary representatives of the consortium involved in all phases of the policy and planning of this training program were:

(1) Dr. Robert S. Randall, Deputy Executive Director
Southwest Educational Development Laboratory

(2) Dr. Harlan Ford, Assistant Commissioner
Texas Education Agency

(3) Dr. Jackson B. Reid, Associate Dean for Graduate Studies
College of Education/University of Texas

(4) Dr. Oliver Bown, Co-Director
Research and Development Center for Teacher Education

(5) Dr. Dorothy A. Fruchter, President
Educational Development Corporation

(6) Dr. Milton Smith, Coordinator for Educational Personnel Development
Education Service Center, Region XIII

(7) Mr. Marshel Ashley, Director of Research and Development
Austin Independent School District

(8) Dr. Fred M. Smith, Director of Bureau of Educational Research
College of Education/Louisiana State University

The consortium agencies and their resource personnel are:

(1) Southwest Educational Development Laboratory
Dr. Robert S. Randall, Deputy Executive Director
Dr. Don Williams, Assistant Deputy Executive Director
Dr. Walter F. Stenning, Director of Training Systems Design
Mr. C. Thomas Camp, Assistant Director of Training Systems Design
Mrs. Shari Nedler, Director of Early Childhood Systems Design
Mr. Joe H. Ward, Senior Research Analyst
Mr. George Higginson, Director of Laboratory Planning Office
Dr. Dell Felder, Consultant to Learning Systems Design
Mrs. Martha P. Cotera, Librarian and Information Specialist
Mr. Juan R. Lujan, Director of Language Development/Reading Program
Mrs. Martha Smith, Director of Multicultural Social Education Program

(2) Texas Education Agency
Dr. Harlan Ford, Assistant Commissioner for Teacher Education and Instructional Services
Dr. Irene St. Clair, Educational Program Director/Mathematics
Dr. Al Little, Director EPDA
Mr. Walter Howard, Director of Division of Assessment and Evaluation
Mr. Charles Nix, Associate Commissioner for Planning
Mr. Keith Cruse, Division of Assessment and Evaluation
Mr. Juan Solis, Director of Bilingual Education

(3) College of Education/University of Texas at Austin
Dr. Jackson B. Reid, Associate Dean for Graduate Studies
Dr. Wayne Harold Holtzman, President, Hogg Foundation for Mental Health
Dr. E. Wailand Bessant, Professor
Dr. Jean York, Associate Professor
Dr. Jack M. Knutson, Associate Professor

(4) Research and Development Center for Teacher Education
Dr. Oliver H. Bown, Co-Director
Dr. Robert F. Peck, Co-Director
Dr. Shirley L. Menaker, Director of Psychological Assessment Division
Dr. Donald J. Veldman, Coordinator of Assessment Division

(5) Educational Development Corporation
Dr. Dorothy Fruchter, President

(6) Education Service Center, Region XIII
Dr. Milton L. Smith, Coordinator for Educational Personnel Development

(7) Austin Independent School District
Mr. Marshel Ashley, Director of Research and Development
Mr. Ronald Beauford, Vice-Principal, Murchison Jr. High School

(8) College of Education/Louisiana State University
Dr. Fred Smith, Director of Bureau of Educational Research
Dr. Sam Adams, Professor
Dr. Robert C. Von Brock, Professor

In addition, the consortium called upon a number of outside sources to provide additional expertise. These included the following consultants:

(1) Dr. Francis Chase, Resident Consultant
Southwest Educational Development Laboratory

(2) Dr. Michal Clark, Assistant Professor
Arizona State University

(3) Dr. M. David Merrill, Department Chairman
Instructional Research and Development/Brigham Young University

(4) Dr. Matthew Cooper, Department Chairman
Psychology and Guidance/Texas Southern University

(5) Dr. Stephen Friedlander, Director of Program Development
Human Development Institute

(6) Dr. William Ward, Professor
McAllister College

(7) Dr. Frederick Haddad, Assistant to the President
United States Research and Development Corporation

(8) Dr. Thomas Owens, Program Director of Evaluation
Dr. Stephen Schwimmer, Program Director of Applied Systems
Dr. Richard Gustafson, Program Associate for Evaluation and Systems
Santa Clara County Office of Educational Center
for Planning and Evaluation

A second type of resource was the group of respondents to RFP 70-27. Thus far, interchanges have occurred with four of the six developmental projects. These are:

(1) Cornell University
Dr. Jason Millman, Professor of Education
[An instructional module in the techniques of research viewing]

(2) Far West Laboratory for Educational Research and Development
Dr. Bela H. Banathy
[An instructional program for acquisition of knowledge, skills, and attitudes by the diffuser/evaluator]

(3) Education Testing Service
Dr. John J. Fremer, Assistant Director/Test
[A filmstrip on planning steps for a measurement instrument]

(4) American Institutes for Research
Dr. George L. Gropper, Principal Research Scientist
[A self-instructional program on educational technology]

The purpose of these interchanges was to coordinate the materials involved in the other RFP's with the training design efforts of the consortium. In

addition, a National Review Committee is in the process of being organized. This Review Committee would have the prime responsibility of contributing additional outside expertise to allow for substantive input on a national level. This would help guide the consortium efforts into making a training development that is consistent with the main stream of thinking of the educational community throughout the United States.

Developmental Periods

The consortium unanimously agreed that a systematic approach to training individuals is the most advantageous way of developing a training program that is individualized, flexible, and modular. The efforts of the consortium from June, 1970, through December, 1970, were aimed primarily at the context analysis of the goals, factors, and strategies that would best establish the limits of a training system for RDD&E personnel. After these goals, factors, and strategies had been defined, the consortium moved into the phase of conceptual design focusing on the identification of a logical framework (the system model). Next, the consortium identified the components and elements in the system model (the subsystems and their modular structure). Finally, the consortium described the methods for developing the various components as they would fit into the overall goal of training RDD&E personnel.

During this period the consortium has also addressed itself to the first phases of product design. Objectives for each component and module were specified in preliminary form. Criteria for determining how these objectives were met were proposed, and preliminary costs for developing each component and module were determined. Product design would continue during Phase I (the first year) of the project. Some product design of a revised nature, it is anticipated, would also occur during Phase II (the second year).

The length of the contract that will be given to various consortiums to develop the training program will be forty-two months. This forty-two month period will be broken down into four fairly distinct phases.

Phase I: The Feasibility Period - First Year

During this phase materials for diagnosis, training, and management would be developed. These materials would be tested and revised based on use in their component pieces by various consortium members to aid in the development of their internal staff. Also during the feasibility phase, an extensive list of additional agencies who are interested in the training program and placement procedures would be developed.

Phase II: The Pilot Period - Second Year

During this pilot phase materials developed during the first year could undergo additional evaluation and modification. Further, the subsystems such as training diagnosis or agency and individual selection, would undergo testing in their entirety.

Phase III: The Field Test Period - Third Year

This field test phase would involve evaluation and modification of the subsystems and their components. The primary goal during the field test phase would be the testing of the system as a whole. This would entail the placing of the system in several locations throughout the United States, training a nationally representative group of individuals involved in RDD&E, and determining within the complexities and unique attributes of of various agencies the relative effectiveness of the system.

Phase IV: The Diffusion Period - Six Months

During the last phase the consortium would be involved in completing the materials, writing a final report in regard to the materials themselves, finalizing each subsystem component as

well as the full system, and negotiating for nation-wide dissemination of the training program.

In Volume II, the specific relationships between the subsystems and their modules to the operational Phases I-IV will be presented in detail. Further, the number and types of trainees will be reviewed in relation to the phases. A detailed cost analysis of the entire system development is presented in Volume III.