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MANPOWER DEVELOPMENT
FOR
EGYPTIAN STI SERVICES

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EXECUTIVE SUMMARY

The study is concerned with manpower demand and supply for operating the planned national system of scientific and technical information services in Egypt for a period of the first five years. Based on stated assumptions, the estimated nationwide need is for a staff equivalent to 1,045 full-time persons, divided approximately evenly between professional and paraprofessional personnel. Currently available relevant manpower in Egypt is shown to fall substantially below this figure, as is the current production rate of existing Egyptian educational and training institutions.

To meet the projected demand, an intensive, centrally managed training program is proposed and designed, consisting of short courses of varying length and frequency of offering. The professional careers for which training is proposed are: information service specialists, information systems specialists, and applications programmers; paraprofessional careers include information service assistants, computer supervisors, and computer terminal operators. In addition, two seminars are proposed to be given frequently: a one-day management seminar for top-level decision-makers; and a three-day seminar for technical directors on information support for project management.

The annual capacity of the program is 14,000 student days. This capacity is calculated to supply most of the estimated manpower needs in three years; continued training programs will be needed, however, for a longer period, so as to compensate for the probably unavoidable high attrition rate.

The study outlines the general contents of each short course and seminar, and recommends an approach to a full elaboration and documentation of instructional materials. An Egyptian faculty equivalent to six instructors is expected to implement the program, initially with assistance by U.S. instructors. Administrative considerations and personnel; promotion, recruiting and registration needs; and required physical facilities are described. The full cost the three-year program is estimated at \$595,000, equivalent to \$15 per student per day.

Concluding the study are remarks and suggestions regarding approaches to long-term manpower development through regular programs of education and training.

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PREFACE

The design and implementation of an Egyptian system of scientific and technical information services, intended to support the country's socioeconomic development, is part of an Applied Science and Technology Program under a Project Grant Agreement between the Egyptian Academy for Scientific Research and Technology and the U.S. Agency for International Development. Phase I of the project (November 1979-January 1982) consists of a system analysis and design study.

The project is a collaborative effort of Egyptian and U.S. organizations. The Egyptian Academy of Scientific Research and Technology, with its National Information and Documentation Centre, is the Egyptian executive agency. Egypt-based activities are guided by an Executive Committee comprised of senior Egyptian experts and headed by the President of the ASRT. Technical assistance in Phase I is supplied by a team of U.S. consultants under a National Science Foundation contract (INT-7924187) to the Georgia Institute of Technology. Planning and project management assistance is provided by the U.S. National Science Foundation under a U.S. Agency for International Development Participating Agency Service Agreement.

The publication of this report does not imply official concurrence of the sponsoring agencies with the views and opinions expressed therein.

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A number of Egyptian educators have given me the benefit of their experiences and views. It is a pleasure to thank particularly members of the administrations and faculties of Cairo University's Institute of Statistical Studies and Research (Prof. Dr. S. El-Shayal, Director), and the Department of Librarianship and Archives (Prof. Dr. S. El-Hagrassy, Head). Dr. Mohamed A.K. Madkour, Director General of the Al Ahram Organization and Microfilming Center, and members of his staff kindly gathered and provided background data on vocational education and training in the information fields in Egypt.

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I. INTRODUCTION

The international literature on information careers and manpower development has two recurrent characteristics. One is an agreement on the importance, and the lack, of adequately prepared information manpower; the other is the lack of agreement on what constitutes the information profession.

As an example of the first theme, a 1978 meeting of information experts from the Arab States has concluded that "a principal obstacle to the organization of effective information systems and services in developing countries lies in the scarcity of skilled manpower at various levels. In view of the important contribution that efficiently operated services could make to economic and social development in the Arab region, this is an important problem" (Unesco, 1978a). A survey of university libraries in French-speaking Africa has concluded that their staffs are inadequate in respect to both numbers and competence (Bouso, 1980). Similar conclusions also come from other geographic areas, for instance Indonesia (Lorenz, 1980) and Latin America (Unesco, 1981a). With respect to computer-related careers, a 1978 survey of the Arab region has concluded that "the role of manpower in the informatics industry can hardly be over-emphasized. . . . Manpower with the necessary training is a crucial element of increasing importance" (ALECSO, 1978). Paralleling these sentiments, the manpower issue has surfaced to become perhaps the most important concern of international organizations preoccupied with raising the level of information services in developing countries (IBI, 1976; Unesco, 1981b).

In contrast to the agreement on the importance of the information manpower, one is struck by the diversity of viewpoints on what constitutes the information profession. One viewpoint, prevalently held in both industrialized and developing countries, considers the information profession to be synonymous with "documentalists, librarians and archivists" (Abib, 1978). Unesco guidelines for curriculum development in information studies, being targeted at "documentalists, information specialists, information scientists, and librarians," expand the definition somewhat but proceed to exclude from it "certain specialists, notably analysts and computer scien-

tists and technologists" (Saunders, 1978).

The meaning of "information science" has its own problems. A major 1976 survey of education and training programs in the field concluded that, indeed, "it has not proved possible, nor deemed desirable, to separate library science from information science" (Foskett, 1976). Yet definitions of information science and information services go substantially beyond librarianship and archival studies. To wit: a Unesco-published handbook for information workers defines information services as "a complex, multidisciplinary subject ranging from computer and telecommunications through cybernetics to psychology, logic and techniques of classification and indexing." Information science, in turn, is said to be "the study and analysis of information, formal and informal information systems, the behavior of information users, and the design, implementation, management and evaluation of information systems" (Atherton, 1977). Focus on information systems and their life cycle is, however, also central to the numerically much larger field of informatics -- unless one explicitly restricts such systems to a special category, e.g., those concerned with bibliographic control. Even that delimitation is rather arbitrary, however, at least from the viewpoint of present-day database technology.

Thus the observation that "the ambiguity and confusion in defining the field of information science" was "a major problem affecting the development of educational programs" (El-Hadidy, 1976) still holds. We shall return to this theme in Chapter IV.

1. Objectives of the Study

The intention of Egypt to embark without delay on an innovative program to develop a nationwide system of information services for bringing problem solving knowledge to bear on the country's socioeconomic development, and to render this system operational in three years, has direct implications for information manpower development. The key implication is that the development of such manpower must proceed in two sequential thrusts. One thrust is concerned with the preparation, in the shortest possible time, of an adequately skilled manpower pool sufficiently large to operate the scope of information services planned for approximately the

first five years. The second thrust has as its objective the formulation and institutionalization of "regular" (in the terminology of Unesco and the OECD) education programs for long-term manpower development, and the synthesis of these programs into the country's structure of higher learning, research, and adult education/training.

The present study addresses fully only the former objective. It proposes a strategy for and outlines a program of intensive, non-academic training of professionals and paraprofessionals for the major careers in the planned information services; it recommends an organizational approach to the implementation of this program; and it analyzes its cost.

As regards the second, regular education thrust, the study offers a discussion of relevant issues (Chapter IV) but at this time does not provide specific recommendations regarding academic degree programs and curricula. It does not do so for two reasons: to be realistic, the development of such recommendations should be consonant with the country's information policy, which remains to be debated and enacted; and it cannot undertake the formulation of such recommendations without the participation of Egyptian educators and information professionals who, at this point in time, remain to be identified and brought into the discussion and planning process.

2. Approach to the Study

The standard approach to the formulation of manpower development plans involves several steps (Unesco, 1981a; Imamura, 1975): estimating the real and potential demand for the respective careers in the labor market; developing the profile of the personnel to be trained at different levels of authority and in different categories of specialization, and responding to the assessed demand; reviewing the relevance of existing curricula and training institutions to the demand and the profiles of the respective careers; and, if necessary, proposing to augment or redesign existing programs, and/or to develop new programs.

The present study was generally guided by this methodology. Chapter II estimates the manpower needs of the national STI system in the initial

five-year period, profiles the skills needed, and reviews Egypt's existing manpower and its production sources. Chapter III proposes a national training program of a scope appropriate to the demand projections, and suggests an approach to its implementation and funding.

A substantial volume of relevant international literature has been reviewed and is listed in the Bibliography; some of it is highly recommended background reading for anyone concerned with national information manpower planning (ALECSO, 1978; Harmon, 1976; IBI, 1976; Machlup, 1982; Neelameghan, 1978; Saunders, 1978; Wilson, 1979).

II. ESTIMATED MANPOWER NEEDS AND CURRENT RESOURCES

This chapter attempts to assess 1) the information manpower needs of the planned national system of scientific and technical information services in Egypt, 2) the potential of meeting this demand from the existing manpower resource of Egypt, and 3) the capacity of existing programs of education and training that are appropriate to these needs. No attempt is made here to estimate the manpower needs in professions and activities other than those comprising the planned national STI system; thus, no projections of manpower needs have been made for general library services, the informatics industry, research personnel in information-related disciplines, and the like.

1. Manpower Needs for the Egyptian STI Services System

The basis for these projects is the design and implementation plans proposed for a nationwide system of STI services in Egypt (Slamecka, 1981a; Slamecka, 1981b). These plans envision the development in Egypt of a network of information services consisting of two levels, as follows.

The first level is the formal skeleton of the national network, comprised of a relatively small number of voluntarily coordinated "information service nodes" operated by autonomous organizations selected from key socioeconomic sectors. These nodes will initially perform the following service functions: indigenous database development, searching of local and foreign databases, and document provision from affiliated (domestic and foreign) document repositories. It is planned to establish about half a dozen of these service nodes in the first three years of the program; the number of nodes existing at the end of five years is not expected to exceed ten. The manpower functions and staffing level of a typical node are shown in TABLE 1.

The second level of the proposed STI service network consists of "information service units," to be established gradually throughout the fabric of Egyptian industry, government and education. These units are seen as

inhouse information departments or cells providing one or more of the following functions: promoting use of information and information services; assisting in the use of external information services; and providing a nucleus of internal information services. Depending on conditions such as the size of the agency or company, the nature of its activities, the attitude of management, etc., the size of these units may range from one part-time officer (the information "gatekeeper" and promoter) to a staff paralleling the sectoral service node, or even to an information system department responsible for handling problem-solving as well as administrative data and information.

The growth rate of these inhouse information units is difficult to predict accurately. Few of these are in existence today in Egypt, and their evolution will depend heavily on the intensity of the promotional activities exhibited by the implementors of the national STI services, and on user education. The following considerations were used, however, to derive estimates for this study:

- o The public sector industry of Egypt consists of approximately 200 large organizations. It is speculated that half of these will have, after five years, one or more individuals assigned to information services. One-eighth of these organizations will furthermore operate a small, computer-based, inhouse information service.
- o The higher education sector estimate is based on the assumption that each of the 12 major universities will set up a liaison information function for efficiently linking faculty researchers and others with national and overseas information services and resources.
- o The estimate for the government-owned general services sector assumes that some 100 governmental and non-governmental public agencies, ministries, planning departments, and executive organizations will have established, in five years, small information service units, and that some two dozen of these will operate inhouse databases of non-administrative information.

- o The projections for the private industry sector are intentionally conservative. Although there are some 15,000 firms in Egypt's private industry sector, they are small companies whose resources may not allow them to establish inhouse information services; they are more likely to be clients of the sectoral information service nodes.

In order to translate the requirements into useful data, it is necessary to classify the manpower functions into homogeneous categories or "careers" at the professional and paraprofessional levels. Although a variety of such schemes exists (Kaminecki, 1981; King, 1980; Nunamaker, 1981), the positions identified in TABLE 1, as well as those expected to be staffed in the information service units, fall logically into three professional and three paraprofessional careers, as follows:

Professional Careers

- a) Information Service Specialist, performing one or more of the following functions: acquisition and intellectual analysis of data and information sources (documents); analysis of data and information requests by users; searching of printed and non-print information sources on behalf of users; interpretation of relevant data and information, and assistance in solving users' problems; information service promotion and marketing; and management of the above functions.
- b) Information Systems Specialist, whose functions include one or more of the following: systems analysis of organizational information processes and needs; specification of information system requirements; development of information systems employing user-transparent computer facilities; instruction of and assistance to others in using such systems and facilities; and management of the above functions.
- c) Applications Programmer, responsible for enhancing the utilization of the database and data processing technologies in the environment of information services through applications programming, software modification and software maintenance.

TABLE 1. INITIAL STAFF OF AN INFORMATION SERVICE NODE

FUNCTION	FULL-TIME EMPLOYEES		
	PROFESSIONAL	PARAPROFESSIONAL	CLERICAL
<u>ADMINISTRATION</u>			
Director	1		
Secretary (word processing)		1	
Typist, telex operator			1
Clerical (mail room, reprography)			0.5
<u>DATABASE DEVELOPMENT</u>			
Proofreading, vocabulary development	1		
Data collection, item description	2	1	
Data entry		1	
Typing, clerical			0.5
<u>DATABASE SEARCHING/DOCUMENT PROVISION</u>			
Search formulation, execution	2		
Maintenance of computer files	1		
Document delivery service			0.5
<u>LIBRARY</u>			
Reference collection, referral service	1		
Typing, clerical			1
<u>PUBLISHING</u>			
Copy writing, composition	1		
<u>MARKET DEVELOPMENT</u>			
Service representation, user training	2		
Typing, clerical			0.5
<u>COMPUTER ROOM</u>			
System expert/instructor	1	1	
TOTAL	12	4	4

Paraprofessional Careers

- a) Information Service Assistant, responsible (under supervision of an Information Service Specialist) for routine processing of printed materials, media, messages, etc., and for execution of simple reference questions.
- b) Computer Supervisor, responsible for proper use and maintenance of information processing equipment, and capable of diagnosing malfunctions and carrying out routine repairs.
- c) Computer Terminal Operator, responsible for one of the following two functions: data entry into computer using appropriate database software; or text processing and document preparation using appropriate editing and formatting software.

A projection of Egypt's manpower requirements in these six career categories, based on the stated assumptions regarding the rate of development of information service nodes and units over a five-year period, is given in TABLE 2. The projected needs total slightly over 1,000 persons, about half of whom are in the professional tracks.

The quantitative assumptions underlying this estimate should be challenged by those better acquainted with the Egyptian milieu. Given the paucity of quantitative, national manpower development plans in the information domain of other developing countries, it is not possible to compare the estimates in TABLE 2 with those of other countries, particularly as the latter typically do not plan to undertake information service development in the scope and at the rate contemplated by Egypt. However, if one accepts the premise that the Egyptian national plan for STI services will be implemented in the proposed scope and within the proposed schedule, the projections seem intuitively to lean toward the lower bound.

2. Existing Manpower

A recent survey of Egyptian information manpower (Slamecka, 1981c) sheds light on existing manpower resources in the information domain. This

TABLE 2. FIVE-YEAR ESTIMATE OF INFORMATION SERVICE
MANPOWER REQUIREMENTS IN EGYPT.

MANPOWER CATEGORY	NATIONAL SERVICE NETWORK	LARGE PUBLIC INDUSTRY	HIGHER ED.	GENERAL SERVICES SECTOR	PRIVATE INDUSTRY	TOTAL
Information Service Specialist	75	100	50	100	25	350
Information System Specialist	20	25	25	25	15	110
Applications Programmer	10	20	-	10	5	45
Information Service Assistant	20	100	-	200	50	370
Computer Supervisor	20	25	-	25	15	85
Computer Terminal Operator	20	25	-	25	15	85
	165	295	75	385	125	1,045

- 1) Based on 10 nodes operating under the auspices of the national network of information services.
- 2) Based on 100 large public industrial firms with inhouse information units.
- 3) Based on 12 universities.
- 4) Based on 100 government agencies, institutes, ministries, etc. having inhouse information units.
- 5) Based on 25 large private enterprises having inhouse information units.

survey, conducted in 1980/81 under the auspices of the national STI project, identified a total of 3,172 full-time equivalent information workers in 160 organizations in the production, higher education, and general services sectors. Seventeen percent (539) of these were professionals, 72 percent (2,284) paraprofessional technicians, and the remainder auxiliary staff. The number of individuals having university degrees in information-related disciplines was 125.

TABLE 3 shows the professional and paraprofessional employees according to the area of activity. Analysis of the actual functions performed by individuals within these areas of activity shows that:

- o in publishing, 10 (of 75) professionals were active in the modern careers of lexicography, indexing, abstracting, and bibliography preparation;
- o in technical services, 16 (of 260) professionals and 41 (of 270) paraprofessionals were involved in database and computing work;
- o in user services, 19 (of 182) professionals were active as information searchers and analysts.

While the results of this survey cannot be directly extrapolated for all of Egypt, the 160 organizations surveyed were selected by Egyptian information experts as having a high probability of operating nontrivial information service functions, including academic libraries. It is thus most unlikely that the survey results misrepresent the actual situation obtaining with respect to the career categories defined above. Other, independent expert opinions parallel and reinforce the findings of the survey (McCarn, 1980; Zehery, 1981).

It must be concluded that the existing information manpower of Egypt is not able to man the information services envisaged in the national STI service plan.

TABLE 3. INFORMATION MANPOWER IN 160 SELECTED ORGANIZATIONS IN EGYPT

AREA OF ACTIVITY	PROFESSIONAL		PRAPROFESSIONAL	
	EFT	%	EFT	%
Publications	75	14	1847	80
Technical Services	260	49	270	12
User Services	182	34	176	7
Liaison/Advisory	7	1	1	0
Information Education	9	2	0	0
	533	100	2294	99

Source: Slamecka, 1981c.

3. Capacity of Existing Educational Facilities

Vocational education in the information fields in Egypt is given by several institutions: Cairo University (librarianship/archives, computer science), Alexandria University (computer science), Helwan University (computer science), and American University (computing). While current data on enrollments, graduates, and program descriptions have not been fully available to this study, the following was the recent situation.

The degree programs of the Department of Librarianship and Archival Studies, Cairo University, graduate close to 100 students per year with the B.Sc. degree; only 40 percent of these were said to remain in service in Egypt, however (Palmer, 1978). The Master's degree program output is minimal; and only six students were awarded the Ph.D. degree between 1951 and 1978. The diploma program of the Department (appropriate for students whose undergraduate backgrounds are not in librarianship) graduates less than 10 individuals yearly, due to an extremely high attrition rate. The program offerings of the Department are traditional (Badr, 1976a) and have seen little substantive change despite evaluative studies and proposals (Badr, 1976b; Palmer, 1978). The configuration of faculty specialties of the Department also tends to remain unchanged. In the short run, the Department is thus unlikely to supply Egypt with sufficient numbers of individuals trained for modern information service careers.

As regards computer science education, a 1980 review of the Cairo University degree programs in computer science indicated that the orientation of the existing diploma and graduate programs was toward computer programming and theory of computation, and that it virtually ignored database-related information systems. In an attempt to ameliorate this deficiency three faculty members visited the U.S. for one semester to obtain background in the latter area. Upon their return, a new three-year diploma program in information sciences was proposed for Cairo University (Saleeb, 1981). As of late 1981, it was not possible to predict the enrollment of the new program. It appears then that while some of the computer science graduates of Egyptian universities may eventually be more than well qualified for professional positions as information system specialists, their

current pool and rate of production are indeterminate.

The less than optimistic conclusions regarding the immediate potential of Egyptian universities to generate the needed manpower are reinforced when one considers the structure and length of time of their degree programs: 5 years for an undergraduate degree, 2-3 years for an M.Sc. in the field of one's undergraduate degree, and 2-3 years for a post-baccalaureate diploma in a field other than one's undergraduate degree (which diploma then qualifies the student for admission to the M.Sc. degree program). Post-baccalaureate programs are typically part-time, and their extended duration causes excessive attrition rates; thus they cannot be counted upon to respond promptly and efficiently to the urgent national needs for information manpower development.

For somewhat different reasons, a similar conclusion may be drawn regarding the preparation of the paraprofessional work force for the national STI system. As regards library-oriented careers, graduates of the Cairo University diploma program in librarianship are too few to meet the projected demand, even though their training is generally relevant and could be quickly augmented with specific skills not now covered. Other sources of training (e.g., the 40-hour short courses given by the Arab Regional Center for Research and Documentation) are too sporadic.

Training of information technologists (computer operators, data entry clerks, word-processing secretaries) in Egypt appears to be scattered. Vendor-sponsored training is, understandably, biased toward their respective products; and profit-motivated training organized by private groups varies in quality.

To the knowledge of the writer, the conglomerate of Egyptian organizations now offering educational and training programs in the field is not able to supply the expected manpower needs of the planned information service network. This conclusion and the above analysis argue strongly that the national STI project must take independent steps to assure that the proposed service network is operated by qualified personnel. Such steps are proposed in Chapter III below.

III. PROPOSED MANPOWER TRAINING PROGRAM

Egypt, because of its intention to rapidly develop and efficiently implement a nationwide system of information services for socioeconomic problem solving and decision making, is both in need of and in position to mount a mission-oriented training program for generating a manpower pool for the planned system.

1. General Strategy

The proposed approach is intended to meet the manpower requirements of the first five years of operation of the national STI system, and to do so through an intensive, specially designed program of short, non-degree courses. The program is designed with the intention of supplying the estimated five-year manpower needs (TABLE 3) in three to four years; if continued beyond that, it will allow for a 25 percent attrition rate.

Three parallel sets of short courses are proposed: a) sensitization of the Egyptian management echelon, so that its better awareness of information functions may lead to institutionalization of information services and careers in individual organizations; b) professional education, aimed at producing the necessary cadre of Information Service and Information System specialists; and c) paraprofessional training in skills proper to the career categories defined in Chapter II.

The principal training vehicles are short courses of varying duration. TABLE 4 shows the titles of the specific short courses proposed, their duration, annual frequency of offering, size per class, and anticipated annual student output.

2. Course Curricula

Descriptions of the short courses, including their suggested content and structure, are given in Appendix I. The following summarizes the objectives of each course, the typical qualifications or backgrounds of their attendees, and the skills that they are expected to acquire.

TABLE 4. SCHEDULE AND CAPACITY OF PROPOSED TRAINING PROGRAM

COURSE	DURATION (WORK-DAYS)	ANNUAL FREQUENCY	CLASS SIZE	ANNUAL OUTPUT
<u>Management Seminars for Clientele</u>				
M1. Top Management Seminar	1	6	10	60
M2. Information Support for Project Management	3	6	20	120
<u>Courses for Information Professionals</u>				
P1. Information Service Development	60	4	30	120
P2. Information System Development	60	2	20	40
P3. DBMS Software Development	20	1	15	15
<u>Courses for Information Paraprofessionals</u>				
C1. Basic Library Skills	20	4	30	120
C2. Computer Operations Supervision	10	2	15	30
C3. Text/Document Preparation	10	4	10	40
C4. Data Entry	5	10	10	100

M1. TOP MANAGEMENT SEMINAR

Objective: To impart to top decision makers a sophisticated appreciation regarding the status, trends, services, and policy issues of the information sector and industry.

Audience: Top two echelon executives in government, public corporations, educational institutions, large private corporations.

Expected Outcome: Better awareness of major information programs and issues, resulting in greater attention to, and support of, these plans and issues.

M2. INFORMATION SUPPORT FOR PROJECT MANAGEMENT

Objective: To impart an appreciation of the value and utility of data/information in project management, and to overview microcomputer-based information systems and services for managing and using data/information.

Audience: Technical directors of large projects (5-Year Plan), publicly owned industrial companies, R/D institutions.

Expected outcome: Decision to initiate inhouse actions leading to more systematic management and more effective utilization of data/information in projects and organizations.

P1. INFORMATION SERVICE DEVELOPMENT

Objective: To prepare professionals for information service functions provided by service nodes and other large organizations.

Audience: University graduates with good command of English seeking permanent careers in information services; previous education or work experience in information-oriented fields desirable but not mandatory.

Expected outcome: Ability to assume the professional position of "information service specialist," with competence in one or more of the following functions: documentation, database searching, reference work.

P2. INFORMATION SYSTEM DEVELOPMENT

Objective: To prepare professional staff for the development and maintenance of computer-based functions of information service organizations.

Audience: University graduates with working knowledge of English seeking careers in information systems development. Familiarity with information-related functions of the employer organization required (e.g., for information service nodes, familiarity with contents of course P1; for commercial functions, familiarity with business administration, record-keeping, and similar applications). Previous computer-related experience advantageous but not mandatory.

Expected outcome: Ability to assume the professional position of information system specialists, and performing the following tasks: determine information systems requirements, specify database elements using a standard DBMS, and implement database outputs requiring use of report generator and other software facilities.

P3. DBMS SOFTWARE DEVELOPMENT

Objective: To prepare professional staff for applications programming needed in information service nodes and related organizations.

Audience: University graduates with substantial programming experience and working knowledge of English.

Expected Outcome: Ability to specify, write, test, and document applications programs and routines that may be required to extend the software repertoire and computational capabilities of information services nodes; qualify for professional position of "applications programmer."

C1. BASIC LIBRARY SKILLS

Objective: To train a cadre of paraprofessionals in general library and administrative functions for careers in information service units.

Audience: Secondary school graduates with working knowledge of English.

Expected outcome: Ability to assist, under supervision, with the organization and use of physical information resources in information service nodes and similar departments.

C2. COMPUTER OPERATIONS SUPERVISOR

Objective: To train competent computer operators for information service nodes and units.

Audience: Individuals with working knowledge of English and significant prior experience in maintenance/operation of electronic equipment.

Expected outcome: Ability to 1) diagnose a specific class of microcomputer systems, isolate cause of failure, and take appropriate action; 2) supervise physical operation of microcomputer facilities, including interfaces, use of manuals, etc.; 3) assist other users in proper use of facilities.

C3. TEXT PROCESSING AND DOCUMENT PREPARATION

Objective: To train paraprofessional personnel in use of document preparation software on a specific multiprocessing microcomputer system.

Audience: Skilled typists with good knowledge of English.

Expected outcome: Ability to use editor and formatter utilities of the UNIX or similar type software.

C4. DATA ENTRY

Objective: To train data entry personnel for information service nodes.

Audience: Skilled typists with good knowledge of English.

Expected outcome: Ability to use appropriate DBMS facilities and commands for efficient, low-error entry of English and Arabic textual and numeric data into database.

3. Administration of the Training Program

Clearly, there are different ways in which the proposed program can be implemented. In order to be successful, however, it must be coordinated fully with the plans and implementation activities of the national STI project, so that the scheduling of courses, recruitment of course participants, etc., are optimally synchronized.

For this reason, it is recommended that the proposed training program be organized under a single administration, and that the latter be responsible for its planning, execution, and budgeting. For ease of reference we term this administrative organization the "Information Career Training Center," or ICTC.

The sole purpose and function of ICTC is to plan, schedule, carry out, monitor, and evaluate an intensive program of the designated, non-degree short courses for professional and paraprofessional information careers, and for high level management executives in the decision-making strata of Egypt. It is expected that ICTC will be established as a new entity, either independent or affiliated with an existing institution in the public or private sector. TABLE 5 shows the minimum ICTC staff required to carry out the envisaged training program: 12 professionals, half of whom are instructors, and a support staff of six. It is essential that all employees other than some faculty serve full-time.

For the duration of the ASRT/USAID project implementing the national STI system, ICTC should be budgeted, in full, via a subcontract from the USAID contract. ICTC is viewed as a temporary, bootstrapping mechanism; after the expiration of the USAID contract ICTC may, however, continue functioning at a level commensurate with national needs and resources.

While it is possible to consider other arrangements for implementing the proposed manpower development program, such as subcontracting for individual courses to different organizations in the higher education sector or elsewhere, the controls needed to monitor their performance and the overall effectiveness of the program would be substantially more complicated. In no case should the responsibility for the promotion and recruiting be dissipated.

TABLE 5. INFORMATION CAREER TRAINING CENTER STAFFING REQUIREMENTS

STAFF FUNCTION	POSITION	PERSONS (EFT)	
		PROFESSIONAL	CLERICAL
Manager	Full-time	1.0	
Promotion/marketing	Full-time	2.0	
Registration, logistics	Full-time	2.0	
(Media) librarian	Full-time	1.0	
Egyptian instructors	Full/part-time	6.0	
Secretary/typist	Full-time		2.0
Media technologists	Part-time		1.0
Library clerk	Full-time		1.0
General clerks	Full-time		2.0
TOTAL		12.0	6.0

4. Faculty

The detailed development of the course contents and instructional materials is the first essential step. Because of its urgency, and because of the relative wealth of instructional materials existing in the industrialized countries, it is proposed to have the contents of each course fully developed under a subcontract with U.S. consultants, and to have them deliver each course when offered first in Egypt. Concurrently with the selection and contracting of U.S. consultants, Egypt will identify, interview and contract with Egyptian instructors. The latter will review and critique the consultants' materials, supplement it with indigenous exercises and Arabic materials, and be responsible for team-teaching the first course offerings with the consultants. Subsequent courses will be conducted by Egyptian instructors.

The shorter of the courses may be taught by Egyptian instructors employed on a part-time basis; the two lengthier professional courses are likely to require full-time annual employment.

The estimate of 6.0 EFT Egyptian faculty was derived by totalling the number of classroom contact days per year (594), multiplying by two (on the assumption that each course will be manned by two Egyptian instructors), and increasing the total by 25 percent, so as to allow for preparatory and evaluation activities associated with each course. The year was assumed to have 250 workdays.

All Egyptian instructors are assumed to be on board of ICTC prior to the first offering of each course/seminar, and to team-teach it with the visiting lecturers.

5. Recruitment and Registration of Course Participants

The absolutely essential element of a successful operation of the ICTC program is effective recruitment of course participants.

ICTC must work very closely with the Egyptian organization responsible for the implementation of the national STI system design. The latter is responsible for the identification, selection and contracting of Egyptian organizations that will establish information service nodes, and for the nationwide promotion and diffusion of the STI services. The M1 and M2 seminars are vehicles intended to indirectly assist in this promotion effort, and to lead to the identification and assignment of participants for the professional and paraprofessional courses. ICTC must therefore collaborate with the Egyptian lead agency in the development of promotion materials, in identification and interviewing of candidates for course participation, by evaluating course participants' performance, and in the follow-up on their subsequent assignments and activities in the profession.

ICTC should establish an effective mechanism for registering course candidates, applicants and participants; and operate a student record system containing administrative data on the participants as well as confidential evaluations of their performance and attitudes. A subset of such a database should become a growing inventory of the information service manpower in Egypt.

6. Facilities

To handle the number of courses and student loads, ICTC will require as a minimum four permanently assigned classrooms, each seating 40 students, and one seminar-sized room. While these facilities need not be on the same premises, their location in different parts of Cairo would make it difficult to transport audiovisual equipment and other paraphernalia. (Consideration should be given by ICTC to hold some of the more frequently scheduled courses or seminars in other major cities, however, if instructional materials support can be provided.) All classes should be air-conditioned and provided with suitable outlets for audiovisual technology and computer facilities.

In its organizing phase ICTC should assemble, with U.S. consultants' help, a well-chosen collection of instructional materials, including audiovisuals and software relevant to the proposed short courses, and ap-

appropriate equipment to use these materials. ICTC will need to employ a media librarian and a part-time media technologist who shall jointly manage the use of the hardware and software and maintain them. When not required for use by ICTC, both hardware and software should be available on loan to other educational institutions.

7. Estimated Costs

The overall estimated cost of the proposed 3-year manpower development program is \$595,000 (TABLE 6); slightly over 50 percent of this may be in Egyptian currency.

Given the calculated classroom loads in the suggested courses and the frequency of their offering, the proposed manpower development program has an annual capacity of nearly 14,000 participant contact days. If it were desirable or necessary to recover the full operating budget of ICTC, each participant in the program would have to be charged a tuition of \$8.25 per day (\$115,000 divided by 14,000). For psychological reasons, it would seem advisable to absolve from full payment participants from organizations involved in the implementation of the national STI system. Other organizations, particularly from the private sector, may expect to be charged some tuition.

The total estimated cost of the 3-year training program (\$595,000) is tantamount to a tuition fee of approximately \$15 per student per day.

8. Evaluation

The USAID contractor for the implementation phase will be expected to monitor the performance of the training program, and to recommend such adjustments in the schedule and contents of courses as may be warranted. Upon conclusion of the three-year project, the contracting agency may wish to conduct a formal assessment of the effectiveness of this intensive, concentrated approach to meeting national manpower needs, by using appropriate cost/benefit analysis techniques (e.g., ETS, 1979).

TABLE 6. BUDGET OF THE TRAINING PROGRAM

BUDGET CATEGORY	YEAR 1 BUDGET	TOTAL BUDGET (3 YEARS)
<u>ICTC</u>		
(1) Administrative Staff (Professional) 7 EFT at \$6,000	\$ 42,000	\$ 126,000
(2) Administrative (Clerical) 6 EFT at \$3,000	18,000	54,000
(3) Media updating, course materials, equipment	5,000	15,000
(4) Instructional staff, 6 EFT at \$6,000	36,000	108,000
(5) Publicity, OS&E, equipment maintenance	7,500	22,500
(6) 200 complimentary lunches (M1, M2)	3,000	9,000
(7) Travel (local)	1,000	3,000
(8) Rental of facilities (M1, M2) 25 days at \$100	2,500	7,500
Subtotal	\$ 115,000	\$ 345,000
<u>DEVELOPMENT OF COURSES</u>		
(9) Consultants 200 lecture days at \$500	\$ 100,000	\$ 100,000
(10) Equipment, media, instructional materials, basic library	60,000	60,000
<u>FOREIGN INSTRUCTORS (1ST OFFERING)</u>		
(11) Consultants, 250 days at \$200	50,000	50,000
(12) Travel: 10 trips at \$2,500	25,000	25,000
(13) Per diem, 250 days at \$60	15,000	15,000
(14) TOTAL	\$ 365,000	\$ 595,000

IV. INFORMATION MANPOWER DEVELOPMENT: A LONG-TERM VIEW

In parallel with the intensive non-degree program proposed in Chapter III, Egypt should continue giving attention to structuring and establishing "regular" (in Unesco and OECD terminology) programs of professional and paraprofessional education and training in the information field. For reasons elaborated upon in Chapter II and below, the establishment of such formal programs is time consuming; therefore, they are unlikely to make a decisive contribution to manning the initial implementation phase of the national STI system. In the long run, however, they are indispensable to the nation's culture and economy.

1. University Programs

University-level education is the principal strategy for a systematic development of the evolving body of knowledge, and for imparting to society and individuals principles and techniques that allow them to function effectively and in increasingly sophisticated ways. It is thus not conceivable to abandon, even temporarily, the development of a useful body of knowledge and its transfer via higher learning; the sorry effects of forcing such a discontinuity may be seen in today's China. Without question, Egyptian universities must participate in the development of information manpower.

The basic difficulty that planners of formal education for the information profession have to contend with, however, is one that characterizes most if not all new fields and professions: the uncertainty as to the place of the new field in the structure of knowledge, on the one hand, and as to the place of its practitioners in the structure of occupations, on the other hand (Machlup, 1982). The disagreement is not only intellectual; it is amplified by "territorial" considerations in scientific disciplines, and by economic and social considerations in jobs and employment.

The views that have characterized the nature of the information field and its careers are no exception to these contentions. From the discipline-oriented standpoint, some would like to prove that information

science is a "new" discipline or field, or even a meta-discipline; others prefer to see it as a "natural" part or extension of their own fields or disciplines. So far, neither side has been convincing. The proponents of the new discipline view have yet to show the paradigm or paradigms that are purportedly unique to information science; and those claiming information science as an indivisible part of their field cannot agree on whether the parent field is communication science, librarianship, informatics, or even whether its character is that of social science or natural science. The conflicting views complicate the decisions relating to the selection of disciplines and academic departments for the manpower development function, and cause interdepartmental disputes regarding the direction of programs and curricula.

The predominant view of the recent past has seen the information profession as a derivative of librarianship (Rayward, 1982), undoubtedly partly because of their joint preoccupation with bibliographic organization and reference service. A review of the functions actually performed by information professionals in industrialized countries suggests, however, that the practitioners relate more to the area of informatics -- the applications of information technology -- than to librarianship. In a national survey of information professionals in the U.S. (King, 1980), the largest single functional category was systems analysis and design, with 22 percent of all information professionals. Furthermore, compared with 10 percent of professionals working in libraries and 9 percent in information services, a total of 42 percent professionals considered themselves to be working in computing. TABLES 7 and 8 offer more detail from this survey. The same ratios obviously do not now hold in developing countries; however, countries embarking on the development of nationwide networks of modern information services utilizing state-of-the-art technology would seem well advised to associate the information profession more closely with the field of informatics.

There are conceptual as well as empirical advantages to viewing the information profession as also being in the area of informatics (Gorn, 1982). The heavy application of database and network technologies to information services is taking the design and operation of modern information

TABLE 7. NUMBER AND PROPORTION OF U.S. PROFESSIONALS

INFORMATION FUNCTION	NUMBER OF INFORMATION PROFESSIONALS	PROPORTION OF INFORMATION PROFESSIONALS (PERCENT)
Systems analysis	266,000	16
Systems design	103,000	6
Research and development	21,000	1
Education and training	43,000	3
Management	274,000	17
Preparation of information	213,000	13
Analysis of information	257,000	16
Searching for information	92,000	6
Other operational functions	273,000	17
Other information functions	6,000	< 1
Not specified	93,000	6
TOTAL	1,641,000	101*

*Percentages do not add to 100 because of rounding off.

Source: King, 1980.

**TABLE 8. NUMBER AND PROPORTION OF U.S. INFORMATION PROFESSIONALS
BY WORK FIELD**

WORK FIELD	INFORMATION PROFESSIONALS	PROPORTION (PERCENT)
Computing	683,000	42
Library	160,000	10
Finance	69,000	4
Statistics	2,000	0.1
Education and training	132,000	8
Legal	1,000	0.1
Health, welfare and recreation	11,000	0.7
Agriculture	1,000	0.1
Information services	150,000	9
Technical publishing	39,000	2
Research, science, engineering	125,000	8
Management support	168,000	10
Not specified	99,000	6
TOTAL	1,640,000	100

Source: King, 1980

systems out of the traditional library domain, and it calls for different, technology-intensive skills. In modern information services, not only is the balance between library-trained and technology-trained personnel shifting to the latter but knowledgeable individuals are even beginning to speculate whether the venerable human link between information users and information systems may be a temporary phenomenon (Berger, 1981). The century old domain of documentation — the intellectual analysis and organization of recorded information — is also being assaulted by technology: a recently announced array processing computer obviates the need for indexing and abstracting, manual or machine; instead, the machine stores the entire document and searches the full database at speeds 100 times faster than index-based systems. Electronic publishing, high capacity mass memories, and digital document telefacsimile will tilt the balance even further (Page, 1980).

The portent of these remarks is not to suggest that librarianship has been divorced from the information profession; it has not and shall not be. Rather, the intention is to suggest that a more realistic, presently more hospitable, and therefore strategically more propitious view of the information field is from the vantage point of informatics rather than library science.

What does such a view imply for higher education for information careers in Egypt?

First, it implies a need for a national-level plan for manpower development in informatics, as part of a national information policy. Such a policy does not yet exist in Egypt, although some of its aspects have been enunciated (Adams, 1981).

Second, it implies a need for manpower studies and projections broader and more elaborate than those described in Chapter II. Hopefully, such projection will come from the on-going study of Egyptian manpower needs (Younis, 1979).

Third, it implies a broader range of manpower training programs than is usually embraced under the phrase "information work." While the recently proposed curriculum in information careers for developing countries

(Saunders, 1978) should be an integral part of education in informatics, alone it no longer responds to the national need in an era of modern information networks and transmission.

The discussion, in (Saunders, 1978), of considerations and factors underlying the formulation of programs for information manpower development is highly appropriate for Egypt, and will not be repeated here. Many of these factors directly affect the potential of different strategies for accomplishing educational change, and their impact needs to be considered before a specific strategy -- e.g., an interdisciplinary degree program, a joint degree program with a foreign university, etc. -- is selected. It was noted earlier that for a number of years there have been well-meaning attempts, notably at Cairo University, to accommodate modern information manpower education. These attempts have so far been less than successful, partly because of university regulations governing degree programs, partly because of faculty intransigency at the departmental level. It seems that both of these factors must be overcome for Cairo University to play a more critical part in the supply of professional (in contrast to academic) manpower for Egypt's information sector.

2. Continuing Education Programs

Whereas Egyptian universities, with half a million students enrolled, provide the Egyptian economy and society with an adequate supply of individuals in many vocations, it will be some time before their volume of graduates in informatics meets the country's needs in this fast-growing domain. Experience in all countries has shown that for some twenty years, the manpower demand in this domain has considerably exceed the supply; only in the late 1970's have universities in industrialized countries begun to supply the informatics market with adequate numbers of well trained persons. While the absolute numbers of information manpower demand and supply in developing countries will obviously differ from the countries that produce this technology, it is quite likely that proportionally the gap between supply and demand will initially be at least as large as that in the industrialized nations.

This argument probably also holds for the manpower of the information services sector of informatics, as defined in this study. Assuming that the five-year projection of personnel needed is reasonably correct and that the necessary work force can be generated, Egypt will then possess an information service manpower pool of about 1,000. To estimate the subsequent necessary annual increment, consider that the service will grow nationally at an annual rate of 15 percent, and that the annual attrition rate of the manpower will also be 15 percent; it can then be easily calculated that Egypt should release into this pool over 150 new professionals in Year 6 (and some 260 four years later), and as many paraprofessionals. The output of 150 graduates translates into enrollments of between half to one order of magnitude larger, given the current student attrition rates. While one would expect the demand to level off eventually, another factor moves in -- the technical obsolescence of personnel who have been out of school of more than, say, seven to ten years.

Figures and factors such as these provide a convincing rationale for also planning and instituting manpower development programs other than regular, degree-based education. Indeed, in informatics it is commonplace to look to nondegree, continuing type education and training to meet the urgent manpower needs (ALECSO, 1978; BURMA, 1978).

Egypt, therefore, should plan on continuing and expanding both the range of short courses proposed in Chapter III and the venues for their offering. Potential venues of such training are professional associations, independent training consultants, technological institutes and universities, and national agencies such as the National Information and Documentation Centre and the Central Agency for Public Mobilization and Statistics.

As the country moves toward enunciating a social policy on adult professional or vocational training (Peterson, 1980), time will be ripe to firmly institutionalize such training and education for the informatics and, within it, information service professions. As part of such institutionalization, Egypt should specify courses required for various levels of professional and paraprofessional certification, and link such certification with more attractive salary scales. Indeed, certificates awarded for satisfactory completion of some of the courses proposed in Chapter III

might be considered as a necessary requirement for promotion and/or higher pay. Such incentives go a long way toward upgrading the skills of existing manpower.

Finally, it is worth noting that the intensive training program proposed in Chapter III has some attractive elements which should be retained beyond its duration, especially the manpower inventory database. Other elements should be developed later, such as a clearinghouse of nonformal education and training programs, including foreign-sponsored; inventory of open positions; and a job counselling and placement service.

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APPENDIX

Proposed Short Courses and Seminars

M1. TOP MANAGEMENT SEMINAR

Objective: To impart to top decision makers a sophisticated appreciation regarding the status, trends, services, and policy issues of the information sector and industry.

Expected outcome: Better awareness of major information programs and issues, resulting in greater attention to, and support of, these plans and issues.

Audience: Top two echelon executives in government, public corporations, educational institutions, large private corporations.

Size of group: 10

Duration: 1 day

Frequency: 6 times a year

Method of delivery: Timed presentations; video; live demonstration; questions/answers.

Suggested Coverage

1. Information, problem solving, and productivity
2. The continuing revolution of information technology
3. The planned system of public information services in Egypt
4. Indigenous information management
5. Effective access to global information resources from Egypt
6. Policies for the development of the domestic information sector
7. Specific information policy and program issues
8. Comments and feedback

M2. INFORMATION SUPPORT FOR PROJECT MANAGEMENT

Objective: To impart an appreciation of the value and utility of data/information in project management; to overview microcomputer-based information systems and services for managing and using data/information.

Expected outcome: Decision to initiate inhouse actions leading to more systematic management and more effective utilization of data/information in projects and organizations.

Audience: Technical directors of large projects (5-Year Plan), publicly owned industrial companies, R/D institutions.

Size of group: 20

Duration: 3 days

Frequency: 6 times a year

Method of delivery: Live presentations; video; demonstrations of information service use; precis of suggestions for action.

Suggested Coverage

	Hours
1. The information support function	1
Rationale and objectives	
Scope of information support functions	
Place within project/organizations	
2. Internal and external information characteristics	2
Project "memory"	
Administrative information	
Technical information	
Decision support systems	
3. Information technology support for project/organization	4
User-operable general-purpose microcomputers	
Database management systems	
Telecommunications	
Reprography	

/...

- | | | |
|----|--|---|
| 4. | Information subsystems for project administration | 6 |
| | Records and record-keeping | |
| | Activity scheduling, performance monitoring | |
| | Personnel | |
| | Inventory | |
| | Financial management | |
| 5. | Technical information handling | 1 |
| | Technical documentation standards | |
| | Technical reports, patents, drawings | |
| 6. | Access to External Information | 2 |
| | Range of data/information sources | |
| | Factual and bibliographic databanks | |
| | Egyptian system of public STI services | |
| | Efficient access to global knowledge by project staff | |
| 7. | Development and management of project information function | 3 |
| | Gradual development of inhouse information unit | |
| | Staffing, personnel qualifications and training | |
| | Schedule and cost estimates | |
| | The next step | |

PI. INFORMATION SERVICE DEVELOPMENT

Objective: To prepare professionals for information service functions provided by service nodes and other large organizations

Expected outcome: Ability to assume the professional position of "information specialist," with competence in the design and operation of one or more of the following functions: documentation, database searching, reference work.

Audience: University graduates seeking permanent careers in information services; previous education or work experience in information-oriented fields desirable.

Size of group: 30

Duration: 60 days (3 calendar months)

Frequency: 4 times a year

Method of delivery: Lectures; video; practicum in document work; database retrieval practice. Examinations and formal evaluation of participants.

Suggested Coverage

	Days
1. The Rationale for New Profession	5
Data and information as problem solving resources	
The "information cycle"	
Physical carriers of information	
The emerging information industry	
The Egyptian system of public information services	
2. Information Organization and Management	25
Data and information categories and sources	
Acquisition	
Cataloging, classification	
Abstracting	
Vocabulary control; monolingual and bilingual thesauri and their development	
Indexing and indexes	
Machine formats and standards	

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3. Information Services	10
Populations of users and their information requirements	
Interaction with users	
Referral	
Data/literature searching and reporting	
Document copy provision	
Information analysis/synthesis	
Service promotion	
4. Database searching	15
Database content and organization	
Search fields and output options	
Search logic	
Online search: procedures, aids	
"Delayed" online search	
5. Organization of information service	5
Physical facilities	
Organization	
Cost and financing	
Staffing	
Supervision	

P2. INFORMATION SYSTEM DEVELOPMENT

Objective: To prepare professional staff for the development and maintenance of computer-based functions of information service organizations.

Expected outcome: Ability to assume the professional position of "information system specialists," and perform the following tasks: determine information system requirements, specify database elements using a standard DBMS, and implement database outputs requiring use of report generator facilities.

Audience: University graduates seeking careers in information system development. Familiarity with information-related functions of the employer organization required (e.g., for information service nodes, familiarity with contents of course P1; for commercial applications, familiarity with business administration, record-keeping, and similar functions). Previous computer-related experience advantageous but not mandatory.

Size of group: 20

Duration: 60 days (3 calendar months)

Method of delivery: Lectures, video, guided study of instruction manuals, computer laboratory use. A real-world system development project. Examinations and formal evaluation of participants.

Suggested Coverage

	Days
1. Overview of technology	5
Hardware	
Software	
Communications	
Reprography	
2. Database management systems	10
Data, records, files, file structures, databases	
Database models	
Relational DB: structure, functions, commands, report generator	

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3.	Analysis and design of DBMS-based information systems	15
	Requirements development	
	Data gathering	
	System specification methodologies	
	System design	
4.	Simple programming in DBMS environment	5
	DBMS interface with UNIX	
	UNIX utilities	
	Document preparation via UNIX	
	UNIX shell programming	
	Examples of applications programs	
5.	Project	10
6.	Information system operations and management	5
	Physical facilities	
	Organization	
	Financing	
	Staffing	
	Supervision	

P3. DBMS SOFTWARE DEVELOPMENT

Objective: To prepare professional staff for applications programming needed in information service nodes and related organizations.

Expected outcome: Ability to specify, write, test, and document applications programs and routines as required to extend the software repertoire and computational capabilities of information service nodes; qualify for professional position of "applications programmer."

Audience: University graduates with substantial programming experience

Size of group: 15

Duration: 20 days (1 calendar month)

Frequency: Once a year

Methods of delivery: Lectures, study of instruction manuals, programming exercises. Examination.

Suggested Coverage

	Days
1. Overview of UNIX programming environment	5
File system concepts	
System calls for file manipulation and process creation and control	
Standard input/output library routines	
Using existing programs as tools with "fork" and "exec" system calls	
2. Programming in 'C'	10
Program structure, declarations, control statements, preprocessor features	
how to compile and link 'C' programs	
3. The UNIX shell	6
Basic command language syntax	
Input/output redirection, pipes	
Programming the shell	
4. Text processing	4
The UNIX editor	
NROFF	

C1. BASIC LIBRARY SKILLS

Objective: To train a cadre of paraprofessionals in general library functions for careers in information service units.

Expected outcome: Ability to assist, under supervision, with the organization and use of physical information resources in information service nodes, libraries, and similar agencies.

Audience: Secondary school graduates with working knowledge of English.

Size of group: 30

Duration: 20 days (1 calendar month)

Frequency: 4 times a year

Methods of delivery: Lectures, readings, laboratory assignments, role-playing.

Suggested Outline*

	Days
1. Data and information services	2
The range of data/information resources	
Information service functions	
Organization of information resources and services in Egypt	
The clientele of information services	
2. Organization of Physical Materials	5
The ordering and acquisition process	
Classification schemes and catalogs	
3. Reference tools for fact identification	5
Dictionaries	
Encyclopedias	
Yearbooks	
Handbooks	
Biography sources	
Bibliographies	

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4. Periodical indexes and abstracting services	5
Overall guides	
Subject indexes	
Abstract services	
Statistical indexes	
Machine-readable databases	
5. Government documents	1
Law codes, etc.	
6. The reference interview	2
Basic communication skills	
Listening techniques	
Telephone interviewing	
Referral	
Reference record-keeping	

*Adapted from Bafundo, 1981.

C2. COMPUTER OPERATIONS SUPERVISOR

Objective: To secure competent computer operators for information service units.

Expected outcome: Ability to 1) diagnose a specific class of microcomputer systems, isolate cause of failure, and take appropriate action; 2) supervise physical operation of microcomputer facilities, including interfaces, use of manuals, etc.; 3) assist other users in proper use of facilities.

Audience: Selected individuals with prior experience in maintenance/operation of electronic equipment.

Size of class: 15

Duration: 10 days

Frequency: 2 times a year

Method of presentation: Lectures; in-service training on a microcomputer system; study of technical operations manuals.

Suggested Coverage

	Days
1. Range of responsibilities in an information service	1
2. The hardware/software interface	2
Hardware performance capability	
Software capabilities, limits	
System performance evaluation	
System productivity, job mixes	
3. Computer scheduling	1
4. Effective computer operator	2
Master console operations	
Remote operations	
Telecommunications	
Tape/disc library	
4. Preventive maintenance; troubleshooting	4
Signs, clues	
Fault diagnosis	
Repair/replacement procedures, tools	

C3. TEXT PROCESSING AND DOCUMENT PREPARATION

Objective: To train paraprofessional personnel in use of document preparation software on a specific multiprocessing microcomputer system.

Expected outcome: Ability to use editor and formatter utilities of the UNIX or similar type software.

Audience: Skilled typists with good knowledge of English.

Size of class: 10

Duration: 10 days

Frequency: 4 times a year

Method of presentation: Guided study of appropriate instruction manuals; practice at terminal.

C4. DATA ENTRY

Objective: To secure trained data entry personnel for information service nodes.

Expected outcome: Ability to use appropriate DBMS facilities and commands for efficient, error-free entry of English and Arabic textual and numeric data into database.

Audience: Skilled typists with knowledge of English.

Duration: 5 days

Frequency: 10 times a year

Method of presentation: Guided study of appropriate instruction manuals; practice at terminal.