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ABSTRACT

These guidelines provide general advice on major issues and factors to be considered in formulating an information manpower development policy, especially as concerns education and training of information personnel. The changing information environment and social needs will dictate modifications of these guidelines and the formulation of new ones. The introduction discusses the impact of the information revolution, the concern of international organizations, and the need for policy guidelines. Section two outlines a preamble for specific national policy statements and provides policy objectives. The attributes of information manpower policy development are presented in section three, and section four considers overall policies regarding educational planning. Section five deals with various factors to be considered in planning for the education and training of information personnel, special attention being given to the modular approach to curriculum design and to the importance of provision for research in information science. Section six considers the organizational aspects of information science courses, and the concluding section is devoted to regional policies and programs for cooperation and collaboration in manpower development. A selected bibliography of 82 references is appended. (RAA)

UNITED NATIONS EDUCATIONAL,
SCIENTIFIC AND CULTURAL ORGANIZATION

GUIDELINES FOR FORMULATING POLICY ON EDUCATION, TRAINING AND DEVELOPMENT OF LIBRARY AND INFORMATION PERSONNEL

Prepared under contract for Unesco by A. Neelameghan

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PREFACE

These guidelines were prepared for Unesco under contract by Professor A. Neelameghan, Director, Documentation Research and Training Centre, Bangalore, India, to aid Member States to establish policy on information manpower planning and development.

The present document arose out of a recommendation made at the second session of the UNISIST Ad Hoc Committee on Education and Training Policy and Programme (Paris, May 1976) where it was suggested that the following studies be prepared: Guidelines for Formulating Policy on Education, Training and Development of Library and Information Personnel; Guidelines for Curriculum Development in Information Studies; Methodology for Information Manpower Forecasting (in preparation).

No policy guideline in a dynamic area like the information field can be considered final. The changing information environment and social needs and demands will no doubt dictate modifications in the present guidelines and the formulation of new ones. Furthermore, it is not easy to formulate a set of guidelines applicable in all countries. But the present document may mark the start towards a more definitive statement. Here the objective is to provide general advice on major issues and factors to be considered in formulating an information manpower development policy, especially as concerns education and training of information personnel.

At the request of Unesco, a number of experts have reviewed the preliminary outline and a more detailed second version of the guidelines and offered valuable comments and suggestions for changes. These have, in one way or another, enriched the substance of the document.

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1. INTRODUCTION

1.1 Information revolution

The impact of the "Information revolution" is felt in almost all sectors of society and in the activities of individuals the world over. There is a growing demand for information by an ever-wider range of users - researchers, planners, policy makers, managers, extension workers and the citizen at large. People are becoming increasingly conscious of the implications of the "information explosion", an aspect of the information revolution, particularly the need for developing information systems and services to channel the mass of information for effective use in national development. In this development, the expanding role of information technology - computers, telecommunication systems, printing and reproduction technologies - is notable. Concurrently, the necessity for human expertise to provide the interface between user and machine is becoming increasingly evident. There are new demands for information analysis and evaluation and for interpretative, advisory and educational services; all aspects of information generation, dissemination and utilization are being examined in depth and from an inter-disciplinary angle.

For the foreseeable future, human intervention will continue to be indispensable in spite of sophisticated technology and the need will remain for personnel with technical capacities for planning, directing and operating information systems and services. Information manpower development and the education and training of information personnel must therefore form integral facets of policies and plans for the development of information infrastructures.

The function of a manpower policy is essentially to make rational provision against the background of a formation environment for the expertise needed for smooth development of systems and facilities.

1.2 Concern of international organizations

International professional organizations, including the International Council on Archives (ICA), the International Federation for Documentation (FID), the International Federation of Library Associations and Institutions (IFLA), the International Federation for Information Processing (IFIP), as well as inter-governmental organizations including agencies of the United Nations family and regional organizations such as OECD, OAS, OAU and ALECSO concerned with promoting the use of information in development-catalysing activities have for some years supported various programmes and projects for information manpower development. With the emergence of Unesco's UNISIST programme, NATIS concept and General Information Programme, information manpower development programmes, projects and activities have received increased attention and support at national, regional and global levels.

A selected list of relevant documents is included in the list of bibliographical references.

1.3 Need for policy guidelines

As a part of their national efforts for developing information handling capability, many countries already have programmes and activities designed to prepare information manpower. There is growing concern to ensure that national activities and international efforts in information manpower development and education and training of information personnel are made as effective, systematic and economical as possible. It is felt that information planners, policy makers,

and others involved in planning information manpower development and related educational activities will be helped by policy guidelines, which constitute a checklist of the factors to be taken into consideration.

1.4 Definitions

The following definitions of a few terms indicate the sense in which they have been generally used in this document.

Library science - The discipline concerned with the theory and practice of the organization of reading materials, in graphic and non-graphic form, usually available in libraries to facilitate convenient access and productive use of them, and the management of libraries and library systems.

Documentation - Denotes the analysis of the intellectual content of documents usually of a subject-field and its systematic organization and dissemination with the aid of indexes, abstracts, review periodicals, current contents lists and other alerting services for the use of specialists. It covers data processing, storage, retrieval and dissemination through information services and reporting periodicals, and reprographic and translation services.

Information science - The discipline concerned with the study of the properties and behaviour of information, the factors influencing the flow of information, and the methods and techniques of processing information for its easy accessibility and usability at reasonable cost. It is an interdisciplinary science taking elements from and related to subject-fields including mathematics, logic, linguistics, operations research, management, systems science, library science, etc.

Studies in information science cover the origin, selection, organization, storage, retrieval, interpretation, transmission, dissemination, and utilization of information. Studies on the representation of information in natural language or other symbols, message coding for transmission and information processing devices and techniques such as the computer and software development are also included.

In this document, for the sake of convenience, the term "information science" is used in its wider sense to include library science and documentation.

Education and training - Education usually denotes studies at the university level, of a relatively academic or theoretical nature and leads to the award of higher specialized degrees such as the Masters and Doctoral degrees. Training usually denotes initial professional courses taken by students after completion of academic studies up to and including university, in a university or other institution. In actual practice, such a clear-cut distinction may not exist in all cases. Sometimes academic courses are combined with professional courses at the initial level and lead to the award of a degree at the Masters level.

Professional education and training - The activity (or the result of the activity) of transmitting knowledge and skill necessary for successful performance in the profession concerned.

Information personnel - A generic phrase denoting persons having received education and training in library science/documentation/information science or persons involved in the study and/or practice of library/documentation/information handling activities.

1.5 Conspectus

Section 2 outlines the preamble that might usefully precede a specific national policy statement and provide an overall statement of the objectives of the policy.

Section 3 deals with desirable attributes of the information manpower development policy and stresses the changing nature of the information environment and the need for future orientation and adaptability.

Section 4 mentions overall policies regarding educational planning.

Section 5 deals with various factors to be considered in planning for the education and training of information personnel. These include, the changing concept of information utilization, the basic objective of education and training, the extended role of information science schools in developing countries, and curriculum development. Special attention is given to the modular approach to curriculum design and to the importance of provision for research in information science.

Section 6 considers the organizational and management aspects of information science courses, such as their location, standards and accreditation, equivalence of degrees and the status of information science schools, teachers, etc. The training of teachers of information science is also discussed.

Section 7 is devoted to policies and programmes for co-operation and collaboration in information manpower development among the countries of a region.

2. PREAMBLE TO THE POLICY GUIDELINES

A policy document is intended to provide, among other things, guidance for ensuring consistency in the planning, implementation, and management of the programmes and activities falling within its purview. This objective and the principal aspects of planning and management of information manpower development which the guidelines are expected to facilitate, should preferably be indicated in the document for the benefit of those expected to use it - for example, persons concerned with or involved in planning and policy formulation and education and training activities in the information field. The purpose can be conveniently served by providing, as a preamble to the specific policy statements, an explanation of the general objectives of the policy proposals.

2.1 Overall aspects

In a great many countries a national development plan and/or programme will describe the national objectives and priorities. These plans normally indicate, for instance, the types of programmes and activities foreseen in the various sectors of the economy - agriculture, health, industry, social welfare, natural resources utilization, etc. An analysis of these, in turn, would show the range of subject specialization required and identify present and future information user groups. The objective of an information policy would be to interpret the implications of national developments in terms of information requirements, to develop appropriate mechanisms for effective information handling and transfer to meet those requirements, and to relate these mechanisms to those in current use. The last mentioned aspect requires a mechanism or arrangement for the study and evaluation of the existing situation. It would involve surveying available information sources, systems and services and user groups. Such surveys could provide data on existing job specifications; characteristics and distribution of user groups; information

needs of users; structure and effectiveness of available information facilities; level of information personnel/expertise and the potential; training and retraining requirements; etc. The feedback from the surveys could be used for determining future information policy and manpower development policy.

2.2 Specific aspects

The national information manpower development policy should provide guidance on the following specific aspects of information manpower planning and development.

2.2.1 Goals and directions

Facilitating the establishment of common goals and directions for the national information development programmes and activities and information manpower development, in an optimally productive way, in the given social context.

2.2.2 Identification of needs

Identifying information manpower needs, current, short term (5-10 years) and long term (10-25 years), in all sectors including government, industry, academic, R&D, extension and technology transfer work, and the other activities in which information handling is involved. The need for information personnel of different categories and at different levels should be taken into account.

2.2.3 Survey and forecasting methods

Ensuring that appropriate and reliable methods are used for surveying, data collection, analysis and forecasting the information needs which form the basis for planning national manpower development programmes. These programmes should not be based on assumptions or prejudge society's needs and demands especially when these are in a state of dynamic change. The basic objectives of information support to societal development should, however, be kept clearly in view.

2.2.4 Co-ordination

Providing guidance for the co-ordination of information manpower development programmes with information manpower needs as identified through surveys and forecasts so as to achieve a dynamic balance between demand for and supply of information personnel of different categories and at different levels.

2.2.5 Professional education

Guiding the design, development and operation of programmes for the professional education and training of information personnel of different categories and at different levels as an integral part of the programmes for national manpower development.

2.2.5.1 Educational planning

Recommending that planning for information science education should take into account (a) the state of development - social, political, economic, and technological - and the priority sectors in the national development programme; (b) the state of the information environment including developments in communication; (c) the emerging roles of information in national development; (d) the emerging roles of information personnel; (e) the perceived leadership roles of information science schools; (f) the need for future orientation in manpower planning; (g) the need for transnational orientation in information science education;

(h) the recent developments in information science and technology, communications technology, etc; (i) the forecast of supply and demand of information professional manpower; and (j) the estimated financial and other resources needed for raising the required manpower.

2.2.6 Compatibility

Ensuring compatibility among policy formulations for information manpower development and education and training at the national, regional, and international levels, identifying and harmonizing the common elements but providing for any special national requirements and priorities.

2.2.7 Governmental and professional support

Securing the support and involvement of government, the information profession, and employers of information personnel in the formulation of plans and programmes for information manpower development and for education and training in information science and technology and in the productive implementation of these plans and programmes.

3. DESIRABLE ATTRIBUTES OF INFORMATION MANPOWER POLICY

3.1 Orientation of approach

The national information manpower development policy, being a component of the national information policy and co-ordinated with the national development programme, should take cognizance of and be based on, the prevailing orientation to societal issues. For example:

3.1.1 Impact of social change

The information manpower development policy should be in harmony with the dynamics of social change.

In most parts of the world, particularly in the hitherto less developed regions, society is in a state of transition. Change is a sign of dynamism and development whether it be social, political, cultural, economic, or technological and is accompanied by shifts in power loci. Societal change affects the component structures of society. The information infrastructure is one component which can positively influence and guide social change and development in the desired directions. Therefore, it should be geared to meet changes in the needs and demands of society. The manpower development programme should enable the preparation of information professionals with appropriate social perspective and approaches to societal issues.

3.1.2 Transnational orientation

The policy should not confine its geopolitical emphasis to national issues, although these should be given priority consideration, but also take into account regional and global developments in information systems and programmes. National developments are increasingly affected by regional and global developments in almost all fields of human activity and increasingly nations realize the need to share resources and experiences for mutual benefit. This is true for the information field also.

3.1.3 Future orientation

A national social policy such as that for information manpower development, should be future oriented while retaining and utilizing helpful elements from past and present experience. A policy endowed with this attribute will keep the programmes based on it relevant and useful and will not become quickly obsolescent.

3.2 Adaptability

The information manpower development policy, as an integral component of the national information policy, should be flexible and adaptable to different infrastructures and patterns of information system development. Socio-political structures differ from one country to another; and the direction, mode, and rate of social change may also vary from one society or community to another. Consequently, there may be alternative approaches and a varying number of phases in which the goal might be reached in different social contexts. The national information manpower development policy as a component of the national information policy, should be hospitable to and support such alternative approaches.

3.3 Harmonization

A national policy, while especially formulated to guide national information manpower and educational programmes, should also be compatible, as far as possible, with such policies of the other countries in the region (or at least of those with similar needs, demands, and social structures). The aim should be to harmonize compatible elements by gradually formulating policy elements on the basis of common objectives with appropriate variations for any differences in the socio-economic and cultural environments and government structures of individual countries (see also section 7).

3.4 Systems approach

A systems approach to information manpower development policy formulation would facilitate viewing this policy within the framework of the national information, manpower development, and socio-economic development policies, and would favour developing mechanisms for feedback on changes in these broader policies which might call for adjustments in the information manpower development policy.

3.5 Adequacy

A national manpower development policy should be adequate and self-contained in terms of its prescriptive nature, comprehensiveness, and internal consistency.

3.5.1 Prescriptive nature

To be of practical help, a policy, especially one that purports to be future oriented, should be prescriptive, that is, provide guidelines for programmes and activities, rather than merely descriptive of past and present situations.

3.5.2 Comprehensiveness

An integrated information manpower development policy should be comprehensive and cover, for example, the objectives of manpower planning and development, manpower planning methods, correlation with appropriate national policies, organizational and management aspects, education and training in the information field, maintenance of standards, continuing education, etc. (For convenience, separate documents to be used as a set may be prepared for different aspects - e.g. manpower planning, curriculum, continuing education, etc.)

4. EDUCATIONAL PLANNING

/Note - This section will mention only general policy aspects. A separate Unesco document on information manpower planning methodology is under preparation./

4.1 Socio-political character

Every educational plan - whether for general education or a specialized field, such as information science - is a socio-political document and socio-political factors influence the planners' task. The geographical location, economic and political life and history, indigenous culture and state of development of the country are among the influencing factors. Obstacles to or facilitation of manpower planning and questions of priority are determined by the development milieu. The objective of planning and the task of the planner is to balance what is best with what is possible.

4.1.1 Participatory planning

The substance of policy can be influenced by the contribution of experts to the thinking of decision-makers. For serious planning a collaborative team of clients, implementers, and beneficiaries should be formed to work with decision-makers. In such participatory planning it is essential that the communication among the members be effective.

4.2 Surveys and indicators

Appropriate mechanisms should be developed where necessary and possible to assemble up-to-date and reliable quantitative data as well as qualitative information on the different vectors to be used in setting up priorities and for overall planning. The mechanisms could include surveys, exploratory studies, simulations, futuristic studies, trend analysis, and forecasting. The vectors would include the following:

4.2.1 Geopolitical factors

Geopolitical aspects such as national needs and priorities (for example sectors in which information personnel are most urgently needed), regional needs and patterns, and global developments in information systems and services and their impact on regional and national infrastructures.

4.2.2 Current and long-term needs

Current and long-term needs for different categories and levels of personnel for the information field (for example specialists in information science and technology, designers and planners, managers and service personnel for information systems and services, teachers of information science and technology, information personnel to play link roles in extension service and technology transfer and auxiliary personnel).

4.2.3 Factors affecting demand

Factors affecting the demand for information personnel (for example, changes in the level of literacy, demand for higher education and/or professional qualifications in different jobs in R&D, the production and service sectors, and developments in information technology as these become economically viable for use in different contexts).

4.2.4 Role of information personnel

The changing and expanding roles of information personnel within the country, regionally and globally.

4.2.5 Differentiated educational needs

The pattern of education and training needed for the different categories of personnel.

4.2.6 Educational methodology

Developments in education and teaching methodology.

4.2.7 Infrastructure

National infrastructure including institutional mechanism and available resources to support the manpower development programme.

4.2.8 Pattern of higher education

The structure, organization, and pattern of higher education in the country (for example, types of higher educational institutions and their respective roles in providing education and training for different levels in general academic and professional courses; opportunities for educational advancement from subprofessional level through undergraduate, graduate, post-graduate level in other disciplines and professions). These have implications for curriculum development in information science as well (see section 5.6).

4.2.9 Data on current situation

Specific data on existing information manpower (for example, by age, sex, employment opportunities, type and geographical distribution of employer; rate of attrition of personnel at different levels due to death, retirement, brain drain, etc., and on existing manpower development facilities including continuing education programmes and retraining and re-entry facilities, programmes and opportunities in the country and in the region).

4.3 Planning considerations

4.3.1 Constraints

Planning should aim at opening as widely as possible the area of manoeuvre which will always be limited to some extent by the constraints of knowledge and resources.

Resource constraints include the limitations of financial support available for the programme; the economic status of those enrolling in higher education and professional courses; the availability of scholarships and bursaries; the work pattern of students as influenced by climate, environmental conditions and demands on their time and energy from courses taken concurrently or jobs they might be engaged in; the availability of library facilities and reading materials, teaching aids, computer facilities, good information centres for practical work either prior to or in-course or post-course; the availability of qualified teachers in adequate number (for full-time and part-time work) to ensure the desirable staff-student ratio.

4.3.2 Side effects and trade-off

A systems approach with provision for feedback, as has been mentioned (see section 3 4), could be adopted with advantage. Indirect and side effects and trade-off and opportunity costs between the parameters should particularly be watched for.

4.3.3 Models

While different models (for example, social interaction model, theory-into-practice model, problem solving model) are available for educational planning, it may be helpful to utilize integrally the good features of several of them; but the planner should also realize that in certain circumstances one model may fit the local administrative pattern better than the others.

Models are also helpful as a representation of the system under consideration, and could indicate the information personnel supply and demand situation as the character of the information environment changes.

4.3.4 Scale difference

In the planning process it is necessary to be aware of the differences in scale and scale changes between countries, between pilot experiments and large-scale operations, and between planning to meet short-term needs and that for long-term needs.

4.3.5 Local innovations

It is highly desirable that local education micro-innovations be identified and incorporated into the planning process. Some of these may have more than local significance. Mechanisms should be set up to ensure wider diffusion of such innovations.

4.3.6 Forecasting methodology

It is desirable that the forecasting method adopted be, as far as practicable, simple, flexible and adaptable to different contexts.

Compatibility among the forecasting methods used in different countries should be aimed at by adopting the appropriate Unesco guidelines.

4.3.7 Statistics and statistical methods

It is desirable to ensure compatibility among countries as to the items on which data are collected and as to the methods used for the collection and processing of data. International guidelines such as those of Unesco already available or under preparation should be used.

4.4 National agency

A national agency should be identified to implement the policy, and to guide the evaluation and monitoring of programmes.

5. EDUCATION AND TRAINING AS INSTRUMENTS OF POLICY

Education and training constitute the principal means of developing manpower. Therefore, the national manpower development policy should include adequate guidelines for policy formulation on education and training in information. Elements of such a policy are mentioned here.

5.1 Socially relevant competence

The information manpower development policy in general and the education and training programme in particular, should facilitate the development of information personnel with the appropriate socially relevant competence for information handling and management.

5.2 Accelerating innovation

The education and training of professionals should be aimed at accelerating innovation which could lead to improvements in service, in relevance to individual and societal development needs, and in greater effectiveness per unit of cost. This implies that educational planning should be viewed as encompassing the planning and management of innovation.

5.2.1 Learning opportunities

The information science education plan should provide for (a) diversification of learning opportunities and work capabilities of individuals through appropriate streams of training, interdisciplinary programmes, etc; (b) mobility of trainees from one programme to another, where and when desirable, for cross-disciplinary educational experience among institutions in a country and between institutions in different countries; (c) relating the world of work to the educational programme through work study, school-related apprenticeship, simulation of work situation problems, etc; and (d) developing in the trainee a holistic perspective of information science, technology and service.

5.3 Reorientation of perspective

Education in information science should be planned to lead to reorientation of the trainees with respect to professional tasks and issues. Such changes in perspective include:

5.3.1 Attitude change

From a passive attitude to one of dynamic leadership, experimentation and exploration.

5.3.2 Environment orientation

From an orientation on the past and present context to one including future environment considerations.

5.3.3 Information centre image

From the concept of the library and information centre as a "building" to which people go for information to that of systems and networks in which information flows to points where it is needed whether on demand or in anticipation of demand.

5.3.4 Focus

From technique-centred emphasis to user-centred and service-oriented emphasis, with techniques and technology designed to facilitate service to users.

5.3.5 Media usage

From an essentially book-based service to the use of other media as well for information storage, transfer, and dissemination.

5.3.6 Managerial pattern

From the ad hoc approach of management of information systems mainly based on flair, guesswork, and individual experience to one based on the application of scientific method, forecasting, planning, analysis, correlation, evaluation and application of modern management ideas derived from systems approach, organization theory, decision theory, operations research, etc.

5.4 Educational objective

The national information manpower development policy should recognize the primary objective of the educational programme as to help individuals adjust to the changing environment. The programme should develop in the trainee attitudes and abilities for attaining a realistic orientation to the environment, for checking his cognitive "maps" against the "territory" of experience. The approach should permit the application of scientific inquiry to the educational process, for the testing of theory in practice, and develop in the trainees the ability to create means, methods, and systems to meet the information needs of society more specifically.

5.4.1 Information and society

To acquaint students with (a) the role of information in society - in research and developmental activity, in planning, in decision-making, in problem-solving, in the learning process, and in the day-to-day life of individuals; (b) the information needed for the different kinds of activities; and (c) the economics of information.

5.4.2 Information seeking patterns

To acquaint students with the different modes and patterns in the information seeking behaviour of people and with methods of studying the patterns.

5.4.3 Information resources

To inform students about the characteristics of information resources in society - within government, industry and business sectors, R&D institutions, programmes and missions, academic institutions, professional associations and learned bodies, and regional and international resources - and to develop practical insights and skills in utilizing these resources.

5.4.4 Information services

To familiarize students with basic theories and methods and their application for the analysis, organization, and presentation of information in various types of information services and for different user groups.

5.4.5 Information systems design

To familiarize students with the basis and methodology for planning, designing and development of information systems and services at the local, national, regional and global levels.

5.4.6 Information technology

To provide students with basic knowledge of application of information technology (computer technology, communication technology, reprography and printing technology) to information systems and services.

5.4.7 Information system management

To give students an understanding of the application of modern ideas and techniques of management to the design, operation, control, development and evaluation of information systems and services.

5.4.8 Research aptitude

To develop the ability of students to identify problem areas, apply research methods and design experiments for finding solutions to problems, to formulate research proposals, and to effectively present project reports and dissertations. (See also section 5.7)

5.5 Role of information science schools

The national policy and programme for information manpower development, especially in developing countries, should recognize and support an educational role for information science schools beyond that of providing courses of training to those currently registered. These extended functions to promote an integrated information manpower development programme would include the following:

5.5.1 Continuing education

Organizing and promoting continuing education facilities and programmes in information studies in the form of courses, seminars, workshops, study circles, etc. (See also section 6.5.9)

5.5.2 Research

Identifying areas for investigation and establishing research projects for individuals as well as for teams composed of the schools' faculty, research groups, alumni, or others. (See also section 5.7.2)

5.5.3 Publications

Promoting, preparing and publishing monographs, textbooks, reports and, wherever appropriate, periodicals, to support the education of information personnel, giving priority to national needs.

5.5.4 Resource centre

Developing a resource centre in library and information studies and allied and supporting fields as the focus for exchange of materials with institutions inside and outside the country.

5.5.5 Alumni contact

Maintaining professional contact with alumni, offering them guidance after they have left the school in research as well as the practice of information work.

5.5.6 Pilot projects

Establishing pilot projects in countries where local information systems and services are inadequate, thereby demonstrating to the community the usefulness of information services and providing the faculty and students exposure to actual organizational problems in information services planning and development.

5.5.7 Advisory service

Providing advisory and consultancy services as necessary. This is particularly useful in developing countries where limited professional expertise is available. The teaching and research staff of the school could, for example, help in the planning of information systems and services and in developing information tools and techniques adapted to the local environment.

5.5.8 International contacts

Establishing contacts with centres, systems and programmes for the education and training of information personnel in other countries or with appropriate international organizations, to facilitate the exchange of ideas, experiences, students, teachers, etc.

5.6 Curriculum

/Note - Only elements of policy and guidelines on curriculum design are considered here. A separate Unesco guideline on curriculum development is being issued./*

5.6.1 Orientation

In designing the curriculum the objectives of education and training in information science (see section 5.4) should be kept in mind, and special attention should be given to developing in the students:

(a) professional and academic perspectives of the needs and characteristics of the society which the information systems and services support;

(b) the capability for adapting themselves and their services to new trends in information use and demands;

(c) the ability to select and apply appropriate information handling methods and techniques to improve the effectiveness and efficiency of information services to meet changing user needs; and

(d) the ability to function effectively as a generalist as well as a specialist, or as a member or project manager of an interdisciplinary or interprofessional team.

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* "Guidelines for Curriculum Development in Information Studies", Paris, 1978. (PGI/78/WS...)

5.6.2 Learning process basis

The design should be based on how people learn as well as on what is to be taught.

5.6.3 Coverage

Broad guidelines should be provided on the different levels of education and training courses and research programmes to be developed in the country, and the objectives, entrance requirements, duration, credits, student-teacher ratio, student performance assessment methods, syllabi, areas of specialization, etc., for each category of course. The goal should be to facilitate harmonization of these programmes. Appropriate curricula should be drawn up for the different types of courses (full-time courses, short or refresher courses, etc.) to develop the different categories of information personnel (in library science, information science, systems analysis, systems design, computer application and automation) as well as auxiliary professionals.

5.6.4 Modular approach

It would be helpful to assemble the topics in each of the courses into modules suitable for different target groups, indicating the modules/topics common to several groups and those special to particular groups. This facilitates arrangement of intergroup joint programmes and projects and interaction among groups.

The learning modules should (a) be flexible enough to accommodate students with different learning styles; (b) integrate the theory, practice, and skill elements to be learned; (c) encourage students to learn how to learn so as to encourage continuing education after the formal course; (d) facilitate the use of varied learning methods individually and in combination as appropriate (lectures, group discussions, field work, projects, tutorials, concentrated study, individual study, clinics, colloquia, etc.); (e) aid innovative teaching, creative activity of students, transcend the traditional boundaries between topics/subjects, and stimulate drawing upon the resources of different disciplines; and (f) be reasonably economical in practice.

The course modules should be adaptable to (a) the major requirements of different target groups, such as, information service personnel, information system designers, information system managers; (b) a full-time programme at the Masters degree level; and (c) intensive short courses in a specific disciplinary area or mission, such as, agricultural information, industrial information, health information, social science information, development planning information, etc., given as electives in a regular full-time course or as a continuing education programme.

To illustrate, consider the following course modules or areas of study in information science:

1. the information environment;
2. information sources and communication media;
3. information systems and information programmes;
4. information processing and handling;
5. information technology and systems design;

6. information system/centre planning and management;

7. supporting courses: appropriate selections from logic, mathematics, linguistics, operations research, behavioural sciences, communication, etc.

For the target group information service personnel, course modules 1, 2, 3 and 4 are basic areas of study; for the information systems designing group, course modules 2, 3, 4, 5, 6 and 7 are basic; and for the information system/centre planning and management group, course modules 1, 2, 3, 5 and 6 are basic.

5.6.5 Organization

The design of the information science curriculum should preferably be a collaborative effort (a) by representatives from information science, education, social science and behavioural sciences, and potential employers of information personnel; and (b) among information science schools and programmes for the various categories and levels of information personnel.

5.6.6 Basis of curriculum development

To aid development of a curriculum for library and information science the national information manpower policy should provide guidance on the following:

General national factors including the stage of development of the information infrastructure; national information needs and target groups to be served; current supply and demand for information professionals and short-term and long-term forecasts; characteristics of higher education and professional education (for example, levels, types of training and courses offered); resources and facilities available and which need to be developed (for example, the supply of teachers for different levels and subjects; availability of specialists from other departments for teaching computer applications, linguistics, management, etc.; access to appropriate course materials, library facilities, audio-visual equipment, computer facility, etc.; the extent of financial support that can be mobilized).

Objectives, entrance requirements, course content, duration of study, assessment methods, conditions of course completion, awards, etc., for education and training courses for the different levels and categories of information professionals. Attention should be given to core courses and electives, continuing education and retraining facilities.

The desirability in a given national situation, of pre-entry, in-course, and post-course practical experience for students at the different levels and on the nature and duration of such experience when recommended.

Instructional methods to be used (medium of instruction and special local considerations such as language usage).

5.7 Research in information science

The information manpower development policy should have as an objective the promotion and support of research in information science. This could usefully be a component of the information manpower development programme.

5.7.1 Need for promotion of research

Socio-political, technological and other factors cause changes in the information environment. Information systems and services, information flow patterns, information handling techniques, etc., should be adapted to meet changing requirements. Research helps to identify changes in the environment, to improve existing tools and techniques and to design needed new ones.

In the process of developing information science through research, its interaction with other disciplines becomes increasingly extensive and intensive and leads to their mutual enrichment. The development of information science is accelerated through the cross-fertilization of ideas. Information science has already been enriched through interaction with mathematics, logic, linguistics, operations research, cybernetics, taxonomy, general systems theory, computer science, communication, behavioural sciences, etc.

The application of scientific methods in research enables the orderly process of investigation, the exercise of analytical thinking, and a critical approach to study of a subject. The method generally leads to verifiable conclusions. It thus provides a means of self-correction for a discipline at each stage of its development and helps to minimize the number of faulty steps. Furthermore, the use of scientific methods helps to develop in the research worker a scientific attitude and the habit of systematic thinking, important aspects in building up high level expertise in the field.

5.7.2 Promotion of research by information science schools

Education at the higher levels must be accompanied by research so that faculty and students keep abreast of developments in the field, make useful contributions to the advancement of the subject (an important academic objective) and to the advancement of society.

Universities and specialized academic centres are proper places for developing research programmes and manpower with research capabilities. They furnish the environment and facilities conducive to the purpose. This holds for schools of information science too.

The aptitude for research can be generated and developed in an aspirant who possesses the necessary intellectual and physical capabilities. The educational programme of the school should enable students at the senior level to take the first steps into research work.

In this context a special responsibility rests with the faculty and management of the school. The curriculum for the higher levels should make it possible for teachers to:

(a) study the aptitude of each student through personal contact, individually as well as in small groups;

(b) organize tutorials, group studies, projects, and seminars to encourage and facilitate co-operative effort and learning the productive use of human, documentary, and other resources and facilities;

(c) introduce simple problems of investigation as class assignments, term papers or dissertations to help the students take the first steps into research;

(d) take advantage of opportunities in the classroom as well as outside it to develop in the student the right spirit, correct attitude and open-mindedness for research;

(e) help, guide, and encourage small research efforts by the students including associating the candidates in research done by the faculty;

(f) continue to give appropriate help, guidance and encouragement, even after the student has left school.

It is also essential that teachers themselves do research in information science to prevent their knowledge becoming stale and their passing this out-dated knowledge on to students. Research by teachers is, therefore, essential to:

(a) keep themselves abreast of knowledge in the subject;

(b) inspire students to see beyond the textbook, to glimpse the potential of information science, and the challenges it poses;

(c) set an example for new entrants and the younger members of the profession;

(d) provide opportunities for co-operation of students (however limited the students' contribution may be, it will help induce a desire to do research);

(e) contribute to the advancement of the discipline and to arouse the teachers themselves to higher levels of productivity and creativity.

Aspirants to research should when possible be supported for intensive internship for a period ranging from two to three years in appropriate institutions. This internship will give the candidates opportunity to identify their areas of interest, to develop beyond what can be learned in a formal course in research methodology, and to lay a sound foundation for their future careers whether in research, teaching or service.

5.7.3 National planning for research in information science

It is desirable that a plan for the organization of research in information science be drawn up as part of the national information infrastructure development plan. For this purpose it will be helpful to:

(a) take into account the areas in information science needing research;

(b) divide these areas into those of local, national and international interest;

(c) work out a scale of priority for research projects with particular reference to the country's requirements;

(d) encourage co-operative research effort; and

(e) distinguish between fundamental, applied, and developmental research programmes, wherever practicable and helpful.

In assigning priority for research projects in information at the national level, account should be taken of the following:

(a) the immediate, short-term, and long-term needs of the country in relation to information services to be developed;

(b) practicability of implementation of the developmental work in the context of the economic and social conditions of the country; and

(c) trend of developments in the subject.

Study of the trends of research in information science in other countries should be promoted. Such studies would help each country learn from the experiences of others, avoid unnecessary duplication, plan for a division of research efforts according to the specific, immediate needs of each country and promote integrated development of each branch of the subject. Furthermore, it is unhelpful to transplant into one country the practices of other countries without examining their suitability for prevailing local conditions. Such careful planning would enable each country to contribute to the advancement of the discipline and to contribute effectively to international efforts.

Research in information science may be promoted by and be carried out in:

(a) information science schools;

(b) centres specially designated for research in the subjects;

(c) library and information centres (particularly for applied and developmental research); and

(d) institutions/schools/departments mainly concerned with other disciplines but having information handling as a component study area (for example, computer science departments, communications departments, etc.).

It is necessary to co-ordinate on-going research in the information area in order to minimize duplication of effort and to promote interdisciplinary collaboration. A mechanism should be set up to register and disseminate on-going research projects in information science in the country and to undertake periodic review of the work done.

The establishment of centres and programmes for research in information science, the setting up of scholarships and fellowships, and the support of research projects should be national policy objectives. Support should be sought from governmental and non-governmental educational bodies, industries, etc. Intra-regional collaborative effort in research in information science is considered in section 7.2.

In the planning of research programmes it should be borne in mind that fundamental research cannot be done to plan or order. However, it will be helpful if mechanisms are developed to:

(a) identify fundamental research and the individuals engaged in or capable of such work;

(b) ensure that such work is not interfered with or put under pressure to produce immediately applicable results; and

(c) reduce to a minimum environmental handicaps (for example, difficulty of access to information, peers, etc.) and wastage of intellectual, mental and physical energy on routines associated with the work (for example, provisions of research assistants, fellows, secretarial staff, etc. Incidentally the assistants associated in this way with the researchers will themselves benefit).

6. ORGANIZATION AND MANAGEMENT OF EDUCATION PROGRAMMES

6.1 Course location

Professional courses, particularly post-graduate courses, in information science should preferably be offered and conducted by accredited/recognized universities and university-type institutions.

Information science is an academic discipline and there are several advantages to developing graduate and post-graduate courses and research programmes as an academic discipline in a university environment.

Short-term introductory courses aimed at the technicians level (semi-professionals and sub-professionals) should not normally be the responsibility of universities and should preferably be offered by lower level educational institutions, professional bodies, government departments, libraries, etc. The university school and its teaching staff could, however, assist in the planning, organization and conduct of the courses by provision of lectures, demonstrations and library facilities.

6.2 Standards and accreditation

The national policy guidelines on the education and training of information personnel may prescribe or cause to be prescribed, norms and standards for the different courses provided. The objective should be to guide and help schools improve and update the courses offered by them. In most developing countries where only a few courses exist or which are just beginning to provide facilities for library and information manpower development, the abrupt institution of a national accreditation programme could result in the failure to recognize all or most of the existing courses. This could prove a handicap because the development of the national information infrastructure demands simultaneously the creation of adequate information manpower training and development facilities within the country while advantage is still taken of facilities available in other countries. As standards evolve through voluntary, co-operative, self-development efforts by the schools, they could form, in due course, the basis for a national accreditation programme.

6.2.1 Elements for prescribing norms

The policy guideline for setting up norms and standards for library and information science courses should mention, among other things, factors or elements for which standards may be prescribed. These usually include: objectives of the courses for different levels of training; relevancy and responsiveness of the organization and administration of the programme for meeting national needs and educational standards; finance; faculty and supporting staff quality and suitability; teacher-student ratio; curriculum relevance and up-to-dateness; entrance requirements; methods of student selection; classrooms, library, teaching aids and other physical facilities and services; duration and work-load for each course; etc. Comparability with courses of equivalent levels offered in other departments/subjects should be maintained.

6.2.2 Accreditation

The guidelines on the elements mentioned in section 6 2.1 could form the basis for an accreditation programme in due time.

A national accreditation body with representation from the information science professions (including teachers), education planning bodies, and potential employers of information personnel, should be constituted with necessary powers to (a) draw up guidelines for accreditation; (b) determine the periodicity of accreditation; and (c) formulate the necessary procedures and mechanisms.

The usual procedure is for the accrediting body or person(s) to visit the institution/programme to observe and study, and to interview faculty, administration and students. Self-evaluation reports by the school itself are also used.

It is desirable that the policy and guideline create a simple accreditation procedure. These tend to become complex and costly.

6.3 Equivalence of degrees and diplomas

It is highly desirable that criteria and mechanisms be established at the national level to determine (a) equivalence among the degrees and diplomas awarded by different schools of library and information science in the country; (b) equivalence among the degrees and diplomas in information studies on the one hand and those in other subjects on the other; and (c) equivalence between the degrees and diplomas in information studies in the country and the corresponding ones awarded in other countries.

The establishment of criteria on equivalence of degrees and diplomas would (a) help rationalize job opportunities; (b) lead to harmonization of the curricula, etc., of courses offered; (c) facilitate inter-institutional movement and cross registration of students for courses in different schools; (d) increase the mobility of teachers among schools in the country; and (e) facilitate mobility and cross registration of students and exchange arrangements for teachers between schools in different countries. It is also desirable to establish a mechanism for announcing periodically the equivalences established, changes in the criteria used, etc.

6.3.1 Equivalence criteria

The criteria for equivalence of degrees and diplomas should be primarily based on entrance qualifications, months/years of schooling or number of credits for the course leading to the degree or diploma, content of each of the subject areas taught (theory and practice), accreditation if applicable, areas of specialization and research. Secondarily, the teaching resources and facilities as well as the performance of candidates in the course and in the profession should also be considered. International and regional actions and recommendations in this respect should be taken into consideration in drawing up the national policy.

6.3.2 National body

The national body for setting up equivalence of information science degrees and diplomas may be that for setting up equivalencies of degrees and diplomas in other disciplines as well. However, experts in the subject and teachers and administrators of the courses should be co-opted to assist in formulating the policy.

6.4 Status of information science schools and faculty

The information science school/department/division in a university or university-type institution should have the same status and privileges as the schools/departments/divisions in other disciplines/subject areas in the university providing courses at the same level.

Teachers of information science should have faculty rank and privileges on a par with those of the faculty for other disciplines in the university requiring similar level of qualifications, experience, etc.

6.5 Co-operation and resource sharing

Schools of information science should collaborate and co-operate among themselves and with other bodies and agencies to secure maximum benefit to society through resource sharing. This is a necessity because of the increasing cost of professional education, the need to maintain standards and the need to plan and implement the manpower development programme in a productive way. The following are some areas for co-operative effort:

6.5.1 National policy formulation

The formulation of a national policy for education and training in information science.

6.5.2 Planning of manpower

The planning of the national information manpower development programme by providing data, surveying job opportunities in relation to changing information infrastructures, etc.

6.5.3 Guidelines

The drawing up of guidelines for different types of courses, curricula, core topics as well as for duration of courses, entrance requirements, equivalence of degrees and diplomas, types of specialization useful in the country, etc.

6.5.4 Distribution of specialization

The sharing of resources by distributing the offering of specialized courses among themselves so as to minimize over-production of specialists in particular areas and ensure the availability of expertise to meet the demands in the country and in the region. Such co-operation could facilitate development of centres of excellence in various subject areas.

6.5.5 Cross registration

Making provision for cross registration of students for different courses as well as for practical work and on-the-job training (where applicable) in different institutions.

6.5.6 Teacher exchange

Providing for the exchange of teachers to facilitate their gaining experience in different contexts, exchanging ideas and experience, and sharing expertise.

6.5.7 Course materials preparation

Preparing course materials, teaching aids, translation of textbooks, monographs etc.

6.5.8 Joint research

Taking up joint research projects and programmes.

6.5.9 Continuing education programmes

The joint organization of programmes for continuing education, workshops, seminars, etc; or the subjects and location of programmes may be rotated or distributed among the schools to enable as many of them as possible to gain experience, to minimize overlap of subjects and programmes, and make possible the exposure of a larger number of information personnel to a wider range of subjects.

6.5.10 Sharing costly resources

Sharing of costly resources, such as a computer facility or audio-visual and reprographic equipment among schools located close to each other; such common facilities could be jointly acquired by several schools in an area.

6.6 Training of teachers of information science

Identifying a sufficient number of good teachers of information science is an important problem in most countries, especially in the developing countries, as progress in education and training in information science depends to an appreciable extent on the teachers. Therefore, information manpower planning should emphasize the education, training and development of teachers. It is inexpedient to presume that those receiving education in information science will necessarily also be able to perform adequately as teachers.

6.6.1 Approaches to teacher-training

Among information scientists in a country only a few may be born teachers; but many can be trained to perform effectively as teachers. It is a moot point whether information scientists intending to teach the subject should undergo a course leading to a degree or diploma in education. There are advantages but it is a costly procedure. It could also take years to produce an adequate number of teachers of information science in this way. Therefore, it would also be advisable to try alternative approaches. A few are mentioned here:

persons with a degree in education may be selected and encouraged to take training in information science; successful candidates may be given preference in the recruitment of teachers of information science;

specialized condensed or short courses in education, oriented to information science teaching, may be instituted in teacher-training institutions to prepare teachers;

one or two schools in a country may orient their information science curriculum to encompass training of teachers of information science;

provision may be made for an elective called "Education in Information Science" in the regular teaching programme;

workshops, summer institutes, etc., in teaching methodology may be organized periodically;

candidates may be trained abroad where facilities for training teachers of information science are available.

In order to ensure that persons with such special training are adequately utilized, it is desirable that, as a matter of policy, schools of information science give preference in recruitment to persons so trained. Also, suitable incentives should be given to information scientists who undertake training in educational methods.

7. REGIONAL CONSIDERATIONS

The principal reasons for formulating a policy for information manpower development for a region would be to encourage collaborative effort and sharing of resources among the countries of the region. In general, the regional policy should create and strengthen national capability in the education and training of information specialists, teachers of information science, and the users of information. National efforts should be supplemented by taking advantage of the facilities available in other countries of the region.

National information manpower development policies of the countries in a region should progressively be based on common objectives, approaches and procedures. At the same time, it is necessary to recognize that the countries may not have similar economic, social, educational and governmental structures and may be at different stages of development, particularly in the information field. Therefore, it is desirable that information manpower development and education in information science and technology be phased appropriately for each country in conformity with its manpower needs, resources available, pattern of education, etc., without detracting from the achievement of the overall objectives of information manpower planning and education for the region.

7.1 Regional co-operation

Collaboration and co-operation among the countries of a region in the field of information science education, should be promoted through the development of mechanisms for the exchange of ideas and experience, securing maximum utilization of expertise available in the specialized subject areas, developing training facilities in the region, and exchange of teachers among the schools/departments/institutions. To facilitate such collaboration the preparation of tools such as directories of programmes, compendia of courses, registers of teachers, and inventories of course materials and educational aids, should be promoted and supported. Also, the adoption of a uniform set of guidelines for the accreditation of information science courses in the region would be helpful.

7.2 Joint research

Recognizing the importance of research by faculty, students, and others, it is desirable to promote joint research programmes (including those in inter-disciplinary areas) among the information science schools in the region. Also, areas for specialization and research could be shared among the schools of the region.

7.3 Continuing education programmes

Continuing education programmes, such as seminars, workshops, etc., for information personnel could be organized on a collaborative basis among the countries of the region.

7.4 In-service training

In-service training and on-the-job training in specialized areas for personnel of one country may be provided in another country in the region.

7.5 Educational innovation

It is desirable to develop a collaborative programme for generating and introducing educational innovations in information science.

7.6 Preparation of guidelines

Information science schools and information specialists in a region should co-operate in drawing up guidelines for different types of courses, their duration, curricula, admission requirements, core subjects, subjects of specialization, etc., so as to encourage harmonization in respect of these elements in the programmes of the region.

7.7 Advanced training facility

Intra-regional co-operation for the establishment of a regional programme for advanced training and research in information science should be considered in the regional manpower development programme.

7.8 Teacher-training

Intra-regional co-operation for the establishment of a regional institute/programme for the training of teachers of information science could be considered as a part of the regional manpower development programme.

7.9 Bilateral agreements

Countries in the region should be urged to include information science education in bilateral agreements in the cultural, educational, scientific and economic fields. This would facilitate co-operative arrangements for exchange of teachers and students and joint research, seminars, workshops, etc. Such action should be taken at the intergovernmental level by the appropriate departments of the national governments.

7.10 Co-ordination of programmes

A mechanism should be established to co-ordinate the various projects, programmes, seminars, conferences, etc., in the field of information science education in the region which are sponsored and carried out by various international, intergovernmental and non-governmental organizations, as well as by regional bodies, so as to facilitate the economic use of the available resources of these organizations and of the resources of the countries in the region.

7.11 Regional body

It is desirable to establish a mechanism such as a standing committee or bureau with representatives from the countries of the region and appropriate international and intergovernmental bodies concerned with education in information science, to carry out recommendations regarding intra-regional co-operation and to review from time to time actions taken in this regard.

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