Presentation of Information and its Educational Role in Response to Complexity

It is obvious that with the increase in complexity of society and its problems, there is a much greater dependence on information. The point was recently made by Helmut Arntz, President of the International Federation of Documentation :

« *Quiconque dans cette situation se hasarde à faire des pronostics sur l'avenir* de *l'humanité, ne peut pas ignorer l'antithèse entre le pouvoir inoui que nous confère la technique (y compris celui de nous détruire nous-mêmes), et la faiblesse de notre volonté, la médiocrité des moyens intellectuels dont nous disposons pour son application intelligente... Aujourd'hui, nous l'avons vu, l'information n'est plus en premier lieu l'étendard triomphal du progrès. C'est le seul moyen de garder suffisamment le contrôle de l'évolution pour que l'humanité, forte de ses connaissances et de ses expériences, tirant habilement parti de toutes les données de l'information, conserve toujours une avance sur la menace qui peut mener à la catastrophe* ».

A distinction must, however, be made between (a) the increasing quantities of information required, (b) the increasing quality and accuracy demanded, and (c) the improved structuring of the information necessary to facilitate its use.

In a social environment in which the problems may be considered relatively isolated and easy to place within the mandate or field of concern of a single organization or discipline, the methods of structuring that information can be simple (e.g. alphabetic order, hierarchically structured classification, etc.). Unfortunately, the social environment is now highly turbulent and information can no longer be adequately handled by such approaches, as the following quotations make clear :

« *The problem is that in most, if not all spheres of inquiry and choice, quantities of raw information overwhelm in magnitude the few comprehensive and trusted bodies or systems of knowledge that have been perceived and elaborated by man... Where, for example, does the novice urban mayor turn to comprehend the dynamic interrelationships between transportation, employment, technology, pollution, private investment, and the public budget; between housing, nutrition, health, and individual motivation and drive ? Where does the concerned citizen or Congressman interested in educational change go for the best available understanding of the relationship between communications, including new technology, and learning ?* » (McGeorge Bundy. Managing knowledge to save the environment, US House of Representatives, 1970).

* *Many of the most serious conflicts facing mankind result from the interaction of social, economic, technological, political and psychological forces and can no longer be solved by fractional approaches from individual disciplines... Complexity and the large scale of problems are forcing decisions to be made at levels where individual participation of those affected is increasingly remote, producing a crisis in political and social development which threatens our whole future* ». (OECD. Bellagio Declaration on Planning 1968).

* *The most probable assumption is that every single one of the old demarcations, disciplines, and faculties is going to become obsolete and a barrier to learning as well as to understanding. The fact that we are shifting from a Cartesian view of the universe, in which the accent has been on parts and elements, to a configuration view, with the emphasis on wholes and patterns, challenges every single dividing line between areas of study and knowledge* ». (P.F. Drucker, The Age of Discontinuity; guidelines to our changing society. 1968).

In such a complex context a key issue is therefore how to select, structure and represent information in order to facilitate, rather than hinder, social innovation. And in a very real sense the ability to engender appropriate social innovation is directly dependent upon the innovative character of information delivery to the user. If the user is obliged to devote a considerable proportion of his available time, energy and resources to compensating for inadequacies in the nature of the information delivered, it is much less likely that the available information will provide a constant stimulus to innovation. It will also be much easier for some to adopt a strategy which denies the possibility of innovation. The above problems of information delivery and the possibilities for their solution, can be usefully discussed in terms of the following interrelated areas :

Kinds of information

Information is mainly collected about

a. « subjects » as distinguished in a variety of document classification schemes. A « subject » is a very general concept covering a hodgepodge of topics ranging from fields of knowledge and skill, through areas of experience and belief, to concern with a particular region, place or person. Classification schemes have not attempted to distinguish and interrelate the different kinds of « subject » important to social innovation. Documents on subjects are often only classified by author,
b. « subjects » as identified in a population census, registers of companies, employment categories, economic sectors, etc. Because of its nature, such information tends to be mainly quantitative and of necessity mainly processed into an aggregated form in which the individual subjects cannot be either distinguished, interrelated amongst themselves or with subjects of a different kind.

Consider the following kinds of subject which are not generally distinguished as such and yet which would each appear to be important and distinct components of any information facility in support of social innovation.

— problems for which innovative solutions are required
— organizational units acting in some way in response to problems
— intellectual disciplines relevant as a body of conceptual tools to the innovative resolution of a problem
— information sources on problems or their solution
— **legal** instruments relating to particular problems

— human values In terms of which problems are perceived and remedial action is undertaken
— Innovative projects applicable, as proven « blueprints » to the solution of similar problems in other locations.

Such different kinds of information need to be distinguished and interrelated in order to clarify the options for social innovation and resource allocation. So far this has only been systematically attempted at the international level through the experimental project resulting in the Yearbook of World Problems and Human Potential. Similar work remains to be done nationally. An international data bank on proven social innovation techniques and proposals does not yet exist.

Multi-purpose information system

Information relevant to social innovation is used in different ways by bodies having very different priorities and mandates. Generally these very differences are considered adequate justification for the establishment of distinct and unrelated-information systems for purposes such as :

— research on problem/programme relationship
— education about programme
— policy-making to determine programme
— programme management
— public information on programme
— public participation and programme monitoring

The separation of these systems leads necessarily to lack of correspondence between the information they contain about the same problem area and consequently aggravates dangerously the discontinuities and delays in social change processes and their comprehension. As Sir Robert Jackson notes in the Capacity Study of the United Nations Development Systems, for example : « In short, there are now simply too many separate, inconsistent, incomplete information systems relating to some facet of development cooperation activities. » (p. 223, vol II) and - The mere description of the present structure for development cooperation identifies its major shortcomings : it is far too fragmented, and has large areas of overlap which create major problems of coordination and an unnecessary degree of bureaucratic complexity » (p. 288, vol 11). The challenge is to design multi-purpose systems which can filter out information of excessive complexity (or simplicity) according to the requirements of the user. Such systems provide a guarantee that policy is based on the same information as research, for example. They also constitute a needed challenge to develop means of educating people to handle complexity rather than to deny or ignore it.

Flexible data structuring

Information on a complex dynamic environment is of limited value if It is collected and structured in terms of one organization's understanding of a particular problem domain in relation to a particular (short-term) programme obligation. Much information is handled in this way and cannot be adapted to new perceptions and later programme requirements; Typically the conceptual assumptions and simplifications about the way in which the problem complex is organized and handled by particular programmes are built into the structuring of the data (e.g. in computer files and software). The data is not structured to permit later inclusion of alternative relationships between data elements. Typically also the analysis tends to focus primarily on the data elements in isolation rather than on the nature of the (changing) relationship between the elements — which is a prime characteristics of complexity. (This is one advantage of the network-orientation on which the Yearbook of World Problems and Human Potential has been based.) Much work has been conducted on the theory and design of flexible general data structures for computers. Unfortunately, this has not yet been applied to information relevant to social innovation.

Information representation

It is one thing to have physical access to information on all the component elements of a complex situation. It is quite another to be able to represent and display this information in a variety of forms according to the preferences and abilities of the user and his degree of tolerance of displays of different degrees of complexity. The conventional approach is either to deny the complexity and to produce a simplified diagram or metaphorical representation, or to accept the complexity and produce a matrix-type representation or equivalent data plot comprehensible to specialists only. The problems of representing complexity have only been systematically studied in relation to the layout of (airspace vehicle) instrument panels. The myth persists that a complex societal situation can still be adequately portrayed to a « cultivated generalist » on a single sheet of paper, and anything omitted by this degree of data reduction is of necessity irrelevant.

A number of techniques have been developed for representing complex situations but these have not been applied to information directly relevant to social innovation. Examples are network maps, and computer interactive display devices capable of handling ordered structures (as opposed to pictures or lines of text). It is probable that without such techniques, it will be unlikely that we can penetrate the complexity of social situations and communicate whatever insights are obtained. The consequence is poor policy and inability to form a consensus about key issues.

Inter-organization information systems

Information systems are generally designed for one organization to serve its predefined purposes. Occasionally. such purposes may include granting access to other organizations whose purpose it approves. This is a very restrictive and inhibiting approach to the facilitation and catalyzation of inter-organizational activity. This point may best be illustrated by contrast with the telephone network which is employed by each user for his own purposes which change constantly over time. Access is not regulated in terms of the use to which the the facility is put. As a result the facility makes possible many different and unexpected contacts. No equivalent facility to stimulate contact between bodies relevant to social innovation exists. As a result coalitions form and break up slowly and there is considerable lag in response to any emerging problem situation, or alternatively a very poor follow-up to any spontaneous activity. Information systems should be designed to support inter-organizational activity to facilitate rapid response to new conditions.

Images of Man

Social innovation is stimulated and guided by changing concepts of the nature of man. A recent study by the Center for the Study of Social Policy (Stanford Research Institute) makes the point that « Images of humankind which are dominant in a culture are of fundamental importance because they underlie the ways in which the society shapes its institutions, educates its young, and goes about whatever it perceives its business to be. Changes in these images are of particular concern at the present time because our industrial society may be on the threshold of a transformation as profound as that which came to Europe when the Medieval Age gave way to the rise of science and the Industrial Revolution... ». The concepts of man are however themselves developed by the innovations which are implemented as René Dubos has pointed out : - The environment men create through their wants becomes a mirror that reflects their civilization; more importantly it also constitues a book in which is written the formula of life that they communicate to others and transmit to succeeding generations >. More succinctly Winston Churchill's point about buildings, that < We shape our buildings and then our buildings shape us > could as well be applied to the information systems we choose to create.

The question is what effect does the selection of a particular information strategy have on our changing image of ourselves and how does this relate to the kinds of social innovation we consequently prefer ? Conversely, what resistance to social innovation arises from our reluctance to adapt to an alternative image of man ? AJ