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Instructional television (ITV) and radio delivery systems in LDCs are increasingly being used to solve problems of human resource development in remote areas. Because administrators of such systems make decisions which potentially use the full range of both hardware and software of educational technology in development programs, networks operating around these administrators have great potential. This report identifies five areas for networking: radio in rural development; radio in formal education; ITV in total systems; ITV or radio in teacher education; and educational use of satellites. The report proposes that for each area, five to fifteen outstanding national programs be selected from LDCs and their top administrators be invited to join a network of international peers. Network functions would include facilitating communications between network units, coordinating the implementation of cooperative problem-solving studies, convening an annual network workshop, and providing technical assistance of an informational and short-term nature. The information gathered on projects and the network studies would provide data that could be utilized by an information analysis center. According to this proposal, such a center would analyze data and extract guidelines regarding the use of educational technology. Creating educational technology networks consists of two steps: (1) planning a conference for administrators of ITV and radio projects in LDCs, which involves identifying candidates and visiting projects to determine the information needs of administrators, and (2) creating networks and developing network linkages and problem-solving activities.

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MASTER

EDUCATIONAL TECHNOLOGY NETWORKS IN DEVELOPING COUNTRIES

A Strategy for Improving the Derivation and Utilization of Knowledge Regarding the Uses of Educational Technology in Resolving Problems of Development

Howard B. Leavitt

(Final Report)
March, 1975

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MASTER

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APPENDICES

A. Examples of Instructional TV and Radio Delivery Systems in LDC's.

SUMMARY

International networks are global problem-solving systems with great potential for stimulating international cooperation between less developed countries and for producing new knowledge about development in comparative perspective.

Instructional television and radio delivery systems in LDC's are increasingly being utilized to help solve the problems of human resource development, especially in remote areas. Because administrators of instructional television and radio delivery systems make decisions which potentially utilize the full range of both the hardware and software of educational technology in development programs, networks operating around these roles have great potential.

Therefore, five areas for networking were identified: 1) radio in rural development, (1-3 networks); 2) radio in formal education; 3) ITV in total systems; 4) ITV or radio in teacher education and; 5) educational uses of satellite. For each of these topics, from five to fifteen outstanding national programs would be selected from LDC's and the top administrators from each would be invited to join a network of international peers.

The activities of each of the 5-8 networks would be coordinated through the office of a network secretariat. Its functions would include facilitating communications between network units, coordinating the implementation of cooperative problem-solving activities and studies, convening an annual network workshop, and providing technical assistance when needed but only of an informational and short-term training nature.

Over time the networks would turn out a considerable amount of information regarding the status of each individual project, the network studies that would be pursued cooperatively and historical information regarding what actions lead to what results through time.

In order to capitalize upon this rich source of data concerning the uses of educational technology in development, an Educational Technology Information Analysis Center (ETIAC) would be established. Its function would be to critically analyze these data and extract guidelines, principles and generalizations regarding the uses of educational technology. Since data sent to the ETIAC would be delivered on a continuous basis from up to fifty different educational technology projects in as many as thirty LDC's, the data would be both comparative and longitudinal. The ETIAC would therefore have the potential for greatly enhancing the state-of-the-art of educational technology and feeding this information back to the networks and to others interested in development.

The strategy to create educational technology networks would proceed in two steps.

The first step would culminate in an international conference for administrators of instructional television and radio projects in LDC's. Conference planning would involve a survey to identify potential network candidates and field visits to selected projects to determine information needs of administrators, how networks should be established and identification of key participants for the conference.

The second step would be to create the networks on the last day of the conference, appoint a secretariat and proceed with developing network linkages and cooperative problem-solving activities. The ETIAC

would be established but would not be fully operational until after the first year when large amounts of data would become available.

The interaction of the network members, the secretariat and the ETIAC are diagramed on the following page.

B. Examples of Networks Within AID Programs

C. Examples of Non-AID Related Networks in Education

D. Notes on Utilization of Research Results: Distillation of Principles

E. Notes on Information Analysis Center

F. List of Interviews

G. Skills and Knowledge Required by Manager of a Network Secretariat

H. Skills and Knowledge Required by an Analyzer in the I.A.C. for Educational Technology in LDC's

I. Criteria for Selecting a Location for the Educational Technology Information Analysis Center

J. Examples of Non-Profit Organizations Which Fulfill Some of the Criteria for Establishing an Educational Technology Information Analysis Center (ETIAC)

K. References

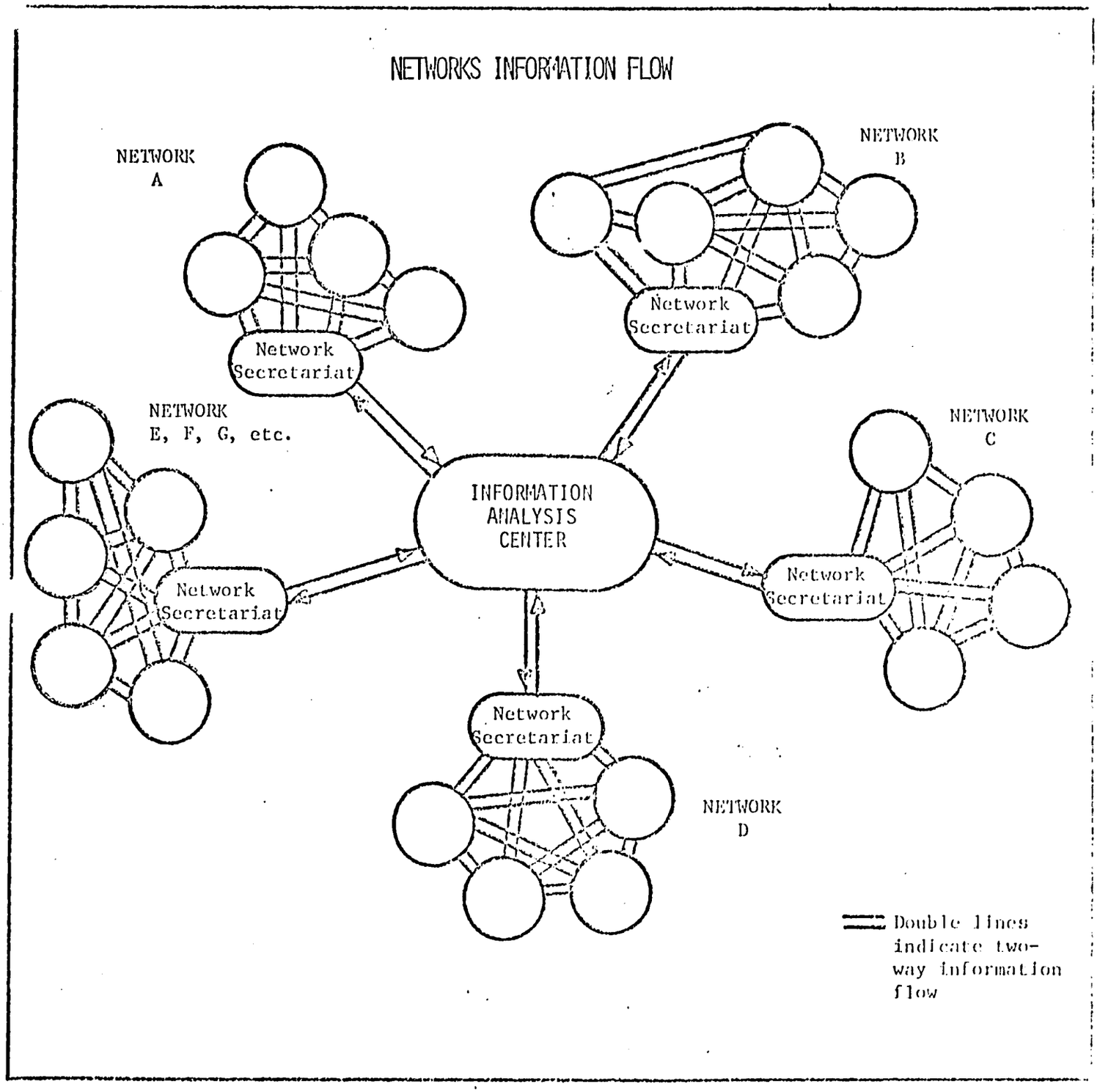

Diagram I: The Information Analysis Center serves the networks in much the same way that the network secretariats serve network units. Each facilitates communication linkages, coordinates data gathering, and feeds back useful information

DEFINITIONS

1. Action-Oriented Research - an attempt to introduce careful inquiry into activities or actions designed to achieve specified objectives.

2. Delivery System - an organized arrangement of components which interact to deliver specified learning objectives.

3. *Educational Technology - a field involved in the facilitation of human learning through the systematic identification, development, organization and utilization of a full range of resources, and through the management of these resources. It includes, but it is not limited to, the development of instructional systems, the identification of existing resources, the delivery of resources to learners, and the management of the processes and the people who perform them.

4. Information Analysis Center (I.A.C.) - a formally structured organizational unit established for the purpose of acquiring, selecting, evaluating, analyzing and synthesizing a body of information and data in a specialized field.

5. Networks - individuals or organizations linked together by intercommunication channels on a regular basis.

6. Network Unit - a single individual or organization forming a part of a network.

7. Research - an attempt to discover new knowledge through various types of careful inquiry involving collection, analysis and reporting of data.

8. Network Secretariat - a function attached to each network designed to facilitate and maintain communication links; facilitate cooperative problem-solving through the planning and administration of studies, workshops and short term training; and serve as intermediary between the network and the Information Analysis Center.

9. Managers and Administrators of Delivery Systems - top level decision makers, executives and program heads who help formulate and execute policy regarding the organization, programming, and operation of ITV and radio delivery systems.

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*We have selected this definition over many alternatives because of its specificity in indicating the basic components of educational technology - people, processes and things, integrated into a total approach to facilitate human learning.

UNDERLYING ASSUMPTIONS

1. Educational technology, as a systematic approach to the planning, organizing, and utilizing a full range of resources for learning has important potential for facilitating the effective development of both formal and non-formal education in LDC's.

2. Administrators, with their conscious and intuitive knowledge of what many program variables are, can effectively contribute to the state-of-the-art of educational technology through cooperative problem-solving activities.

3. Administrators in LDC's (as elsewhere) tend to derive new information and ideas concerning their jobs from personal contacts with peers as much as from reading reports.

4. Administrators will voluntarily form international networks of peers to share information and ideas as well as participate in cooperative problem-solving activities.

5. The organization of international networks around instructional television and radio delivery systems (as opposed to other possible organizing topics such as uses of film, correspondence courses, programmed learning, etc.) is desirable because these areas provide a broad framework to which other aspects of educational technology can be applied, are likely to be addressed to broad problems of human resource development and are centralized, thus permitting one person to speak for and, at the same time, influence a large organization.

6. A network secretariat will be able to serve a useful, valued role as facilitator of network linkages and cooperative problem-solving activities.

7. An Educational Technology Information Analysis Center can perform an important function by analyzing, synthesizing, and disseminating guidelines and principles derived from comparative, longitudinal data about the uses of educational technology in development.

ADVANTAGES AND DISADVANTAGES OF THE NETWORK CONCEPT

International networks are actually global problem-solving systems with national and international components. We identified a number of advantages claimed for networking and also some problems.

Advantages:

1. Networking enhances program development in each country through cooperative problem-solving and at the same time enhances knowledge about the state-of-the-art.

2. The opportunities for inter-visitation, in-service training in another country, and exchange of consultants, are all facilitated.

3. Recurring contacts between professional peers from different countries often produces warm personal friendship, an esprit de corps, and an atmosphere conducive to innovation and rededicated effort.

4. Exclusive attention is directed away from development models established in technologically advanced countries and focussed more on models from other LDC's of comparable background.

5. Professional development of administrators, planners, and technicians in a developing country can be enhanced by ready access to experience from other network countries.

6. Savings of resources through division of labor becomes possible when several countries agree to cooperate in resolving common problems.

7. Innovations are more likely to occur when supported by others even at a distance; a critical mass of innovating people provides strong psychological support for individual initiative.

8. Emphasis is directed away from reliance on technical assistance from a single source towards greater autonomy, self-reliance and assistance from international peers involved in the same type of operations.

9. Organizations in the network are less likely to duplicate efforts in "reinventing the wheel".

10. Attention tends to be drawn away from the uniqueness of problems of development and the differences between nations (which of course exist) to the common problems that mankind faces and the basic similarity of actions that governments around the world are taking to cope with these problems.

11. Membership in a network can have the effect of helping provide continuity through the retention of experience for a country's program, when for political or other reasons, personnel are abruptly changed.

12. Network support can sometimes be used by a practitioner to defend his program in the face of local political pressures.

13. Products of cooperative problem-solving are ready to use in a number of places because they have been tested against situations in the participating countries.

Problems:

International networking contains certain problems and although none should be considered fatal, they need to be carefully identified and resolved.

1. International networks will not become viable unless from the start members believe that they are gaining practical benefits. This positive motivation or interest, which is basically the glue holding the network together must be developed fairly rapidly. Otherwise busy administrators will stay home and tend to their own problems undisturbed by those of others. Thus, in order to coalesce the network quickly and generate the necessary momentum to keep going, an outside "pump priming" effort is essential. This, in the form of funds for such activities as a secretariat, cooperative studies, international travel, and short-term training is difficult to plan for in advance because network activities need to arise somewhat spontaneously from the needs of members. There is therefore a certain amount of uncertainty about the start-up of a network, which good planning cannot entirely eliminate.

2. Networks have a tendency to place excessive reliance upon outside funding and are often reluctant to phase in local resources. This is understandable until clear-cut benefits from membership in the network accrue. At this point the phasing out of external funds and the phasing in of local, requires finesse and diplomacy.

3. International networks operate over long distances, communications are poor, travel is expensive, administrators often become totally engrossed in their work, and diminution of interest in international cooperative problem-solving is possible.

4. Political figures instead of administrators and professionals may designate themselves as network representatives at international workshops and meetings. There has been no ready solution for this problem except to organize workshops, whenever possible, around technical problems where a non-professional will obviously be out of place.

5. The network may flounder through lack of skilled leadership in maintaining network linkages, uncovering common problems, and providing resources for problem-solving activities. This places a heavy burden upon the qualifications of the network secretariat. Locating a staff to fulfill this role is difficult, but not impossible in our view, expecially if the role is supported by a reasonable level of resources for studies, travel and training.

6. Potentially good candidates for a network may refuse to join for a variety of reasons. Leaving the door open in anticipation of a change of heart is the only recourse available.

7. Networks supported through multi-national funding tend to be stronger than those supported through bi-lateral funds. Yet there are few examples of internationally supported networks which were not initially funded from single-country sources. Therefore, it would appear that the initiative for developing new networks, should in most instances, come from individual country funding agencies. At a later stage, the phasing in of international funding would be highly desirable.

8. Networks take considerable time to develop and tangible results are difficult to measure at early stages. A certain degree of patience and long-term resolve is therefore necessary before initiating the activity.

BENEFITS TO A.I.D.

1. Networking has the potential for providing substantial multiplier effect at low cost since the impact is global, activities are self-sustaining and new knowledge, based upon international historical experience, can be used as feedback for ongoing development activities.

2. Networking provides an international problem-solving system from which new principles and guidelines on development can be extracted and disseminated by A.I.D.

3. Networks dealing with educational technology delivery systems can become key mechanisms in developing new strategies for reaching the world's poor, especially in remote areas.

4. Educational technology networks are in a key position to contribute to LDC strategies for integrating the typically fragmented sectors of development.

5. Networks of administrators of television and radio delivery systems which deal with the development of integrated strategies, can provide A.I.D. with an opportunity to make available integrated technical assistance of an informational and training type, from such fields as agriculture, health, nutrition, education, population, women's affairs, etc.

6. Networking can be used by A.I.D. to help shift responsibility for development to LDC's.

7. Networking helps smooth out discontinuities and fluctuations in international donor assistance, thereby rendering these fluctuations less difficult for an LDC to cope with.

8. Support of networks permits A.I.D. to demonstrate its continued concern for LDC's after major assistance has been terminated and helps soften the psychological blow when major A.I.D. assistance is terminated.

9. Support of a network provides a low profile for development activities by A.I.D.

10. Networking is an effective development device for drawing upon a wide variety of talents and local experiences that are mutually reenforcing.

11. Networking can facilitate the identification of new projects, innovations and experiments of potential interest to A.I.D. and international donors.

12. Networks can assist in locating candidates for A.I.D.-sponsored training programs, and serve as an international placement bureau for A.I.D. participant trainees.

13. Information concerning the current status of a large number of human resources development projects can be captured on short notice, reducing the necessity for special efforts to obtain needed data.

SELECTION OF TYPES OF NETWORK

In consultation with AID, we tentatively identified thirteen prominent and innovative areas of activity relating to the use of educational technology in LDC's, each of which could conceivably serve as the major focus for organizing a network. These were as follows:

1. Shared use of educational technology by formal and non-formal education systems
2. Total system usage of ITV
3. Satellite usage
4. Training of educational technology personnel
5. Decentralized regional educational technology centers
6. Measurement of productivity through testing
7. Radio in basic adult education
8. Radio in agricultural education
9. Radio in health and family planning
10. Radio in formal education
11. Computer assisted instruction
12. ITV or radio in teacher education
13. Correspondence courses

Following an extensive search of the literature and consultations with experts we narrowed the list.

We discovered, for example, that there are very few accounts of the shared use of educational technology between formal and non-formal education.

Since this procedure would hold great promise for not only reducing unit costs in formal education but also for opening up new resources for non-formal education, this is an important development to identify. It was decided to drop this item as a separate network topic, but watch for its development as a factor in other networks.

The training of educational technology personnel was eliminated as a separate topic because of the desirability of dealing with it in the context of a larger program concerned with a development goal.

Although educational technology regional centers is a powerful concept for decentralizing resources to scattered users especially in remote areas, we could find few examples, as yet, in developing countries. Therefore this was eliminated as a topic but would be noted as a development to watch as ITV and radio delivery systems expand and mature.

The use of testing to measure educational productivity is being tried experimentally by so few countries as yet that it proved not suitable in itself as a focus for networking. It would be noted as a potential factor in some larger delivery system.

We found virtually no serious use being made of computer-assisted instruction in LDC's.

We concluded that networking was feasible only when the organizing topic was a realatively large type of delivery system, sufficiently centralized to permit a single top-level decision-maker to represent not only his project but at the same time his country or region, and focussed upon an important development goal. We concluded that by concentrating upon large delivery systems, there was the opportunity

to examine the full range of educational technology concerns as part of a systems approach to the achievement of a significant development goal.

In consultation with AID we decided that networks should be organized around delivery systems of various types.

Although the use of satellite is a special type of delivery system dependent upon sub-systems, it was included as a network topic because of world interest and its potential for accelerating the development of sub-systems.

Because of widespread interest in major, on-going ITV programs (e.g. El Salvador, Ivory Coast, Samoa, and Colombia), it was decided that ITV would be an appropriate network topic especially in light of new efforts in cutting costs by expanding coverage to non-formal education.

The special efforts to reach rural teachers via radio and in a few cases, TV, were considered another appropriate network topic, although a narrower one.

In addition, the uses of instructional radio for formal education in remote rural schools, was a second narrower topic, yet important.

We came to the conclusion, based on our investigation, that the uses of radio in rural development represents one of the most active developments in the uses of educational technology for development. However, until more information is obtained as to how radio delivery systems are typically organized, it is not possible to specify whether networks would be organized around the topic of

"rural development" or discrete sectors such as agriculture, nutrition, literacy, etc.

Because of the growing number of programs utilizing radio, and the potential interest that networking will generate, several radio networks might be established around criteria yet-to-be determined.

The revised list is as follows:

1. Radio in rural development (1-3 networks)
2. Radio in formal education
3. ITV in total systems
4. ITV or radio in teacher education
5. Satellite

See Appendix A for examples of possible country candidates for these networks.

THE NETWORKS: OPERATION AND MAINTENANCE

Activities

The kinds of joint activities that keep a network in operation will vary from year to year and network to network. Certain activities are simple and inexpensive, others complex and costly. Some activities could only take place after a network had matured, when administrators from respective countries knew and respected one another, and when additional outside funds had been attracted. Examples of joint activities could include:

- -- exchange of periodic status reports to keep one another currently informed on new developments and current addresses of key persons
- -- cooperative problem-solving activities (for examples see below)
- -- exchange visits, exchanges of technical assistance
- -- exchange of interns or staff for cross-national experience
- -- development of joint short-term training programs for members of respective professional staffs
- -- development of joint long-term training programs at a common training center or university
- -- network representation at international conferences, using network comparative data as basis for paper or speech
- -- sub-network workshops, cooperation between two or more members
- -- division of labor-type of cooperation between members, especially regarding production of software

-- establishment of centralized network functions at one geographical location for training or production of software

-- if feasible, network or sub-network conferences using communications satellite facilities, especially if these would permit the reduction of frequency of international workshops and the high cost of travel

-- major cooperative research projects with special funding

Funding for Network Activities

Until the networks have experienced the benefits of international cooperation, it is unrealistic to expect the contribution of anything more than modest local funding. Therefore, AID funds would be used, in effect, as "pump priming" resources to provide the initial impetus for networking. These funds however, would be limited for the most part, to supporting the secretariat, cooperative problem-solving activities and international travel for the network periodic workshop. Specifically excluded would be funds for technical assistance to individual countries since this would tend to destroy the autonomy and cohesion of the network. The secretariat, while conceivably providing information on whom to contact for specific technical assistance, would avoid the subject as a distraction to the goal of network cooperation. It is expected that by at least the second year of operation, funds from other sources would start to phase in. Within two to three years it is expected that international sponsorship accompanied by international

funding, would take over the project.

Geographical Location of Workshops

The location of the annual or periodically scheduled network workshops would be rotated among members. First consideration would be given however, to convening the workshops in countries where, without deviating too far from a direct line of flight, traveling representatives could conduct stopover visits to other members' countries. Clearly, an important step, at least initially, in coalescing a network of administrator peers is to establish personal contacts and friendship through intervisitation.

The Annual Workshop

The secretariat of each of the 5-7 networks would convene its annual 2-4 day workshop but the agenda would be a product of joint decisions by network members. Examples of workshop activities would be:

-- secretariat report on latest bird's-eye-view of network activities and suggestions for fruitful linkages

-- discussion of a completed joint study and how to implement

-- identification of problems for further studies

-- short-term training courses (1-2 days) on topics selected by the network given by AID specialists or others

-- feedback from ETIAC on newly developed guidelines and news from other networks

-- etc.

The Network Secretariat

The role of the secretariat is crucial to the development of networks for it is through its initiative that the network coalesces and develops. Later, when countries have developed strong inter-linkages and the capacity to initiate their own cooperative activities, the leadership function of the secretariat can be expected to diminish.

Although the secretariat of each of the 5-7 networks would differ somewhat, in general four distinct roles would be played by each:

-- communications facilitator

-- coordinator of cooperative problem-solving studies

-- contact for introducing outside information and short-term training resources

-- network link to the Educational Technology Information Analysis Center

(1) The Secretariat as Communications Facilitator

The secretariat, at least initially, is responsible for helping to develop links between network members. Before this can be started, the secretariat director or staff must personally become well-acquainted with each member of the network and his

program through familiarization visits. These visits could serve another function. In order to quickly acquaint each member with the general description of every other program a brief well-written case study or status report would be prepared by the secretariat. These status reports would be produced annually for keeping members up-to-date. In addition, this information would be forwarded to the ETIAC as base line data for longitudinal analyses of on-going programs.

By personally knowing each program, the secretariat would be in a position to initiate suggestions for mutually beneficial activities of the type enumerated above. One of the key functions of the secretariat is to keep up-to-date on status of every program in the network.

(2) The Secretariat as Coordinator of Studies

Cooperative problem-solving investigations and studies represent the major, most intensive activities of the network. The secretariat is responsible for helping identify problems of major concern to the network and suggesting ways in which these studies can be completed.

Although the 5-7 networks identified earlier differ as to type of delivery system, formal and non-formal education emphasis, clientele, and the substantive content of programs, they are all concerned with basically the same types of problems. It is not possible ahead of time to identify specifically what these

problems would be but on the basis of what others have encountered we would assume typical examples to be as follows.

- how to organize the staff of a delivery system to include the appropriate mix of technicians, media specialists, programmers, subject matter specialists, administrators, etc.
- how to determine and achieve appropriate levels of training for staff
- how to identify, train and supervise community extension workers, teachers and volunteers to serve as ITV and radio monitors and discussion leaders
- how to organize supporting educational technology at the receiving end of ITV and instructional radio
- how to identify and take appropriate action on new formal and non-formal education needs
- how to organize and translate broad program objectives into specific broadcast lessons
- how to pilot-test programs, how to measure impact on target audiences in behavioral terms, how to assess effectiveness of delivery system
- how to coordinate the communications needs of various discrete sectors to encourage integrated development programs
- how to reduce costs of delivery systems
- etc., etc.

Any of these problems, or others, could serve as a cooperative problem-solving activity of the network. How this would be carried out and at what level of funding, would be decided by the network itself although the secretariats' budget for studies would place an upper limitation on costs unless local funds could be added.

Examples of alternative ways for conducting these studies and obtaining local data are listed in ascending order of cost and scope of work.

1. Secretariat staff analyzing data from network units.
2. Regular member of staff of network unit assigned additional duties for studies.
3. Visits by secretariat staff to obtain data.
4. Employment of additional full or part-time evaluation staff at each network.
5. Employment of consultant(s), local or foreign.
6. Contract with local research institute or university.
7. Resident or visiting researcher from an outside-funded special network research project.

As coordinator of studies the secretariat tries constantly to introduce higher, more systematic standards for production of studies consistent, of course, with the practical needs of administrators. In a sense, the secretariat is providing technical assistance in action-oriented research methodology. In line with our original definition of educational technology, the secretariat is also assisting network members to improve human learning through the systematic identification, development, organization and utilization of a full range of resources related to ITV and radio delivery systems. The role is therefore one of providing technical assistance in the field of educational technology in its broadest meaning.

(3) The Secretariat as Provider of Technical Assistance

Although the secretariat will assiduously avoid being drawn in to requests or negotiations for regular technical assistance, he will, however arrange technical assistance of an informational and short-term training nature when feasible. For example, at annual workshops the secretariat may be able to arrange through AID for the attendance of AID specialists in such areas as educational technology, agriculture, education, health, nutrition, population, women's affairs, etc. who, in addresses, consultations, or short-term training sessions could provide needed assistance.

(4) The Secretariat as Network Link to the ETIAC

Periodically, the research secretariat would forward data to the Educational Technology Information Analysis Center including completed studies, status reports, and observations that would add dimension to the work of synthesis and analysis of network experience.

The problem of handling confidential or potentially embarrassing information is inevitably a difficult one requiring sensitivity and diplomacy to resolve.

The Secretariat as Change Agent

In reviewing the research in the literature on ways of inducing social change, effective utilization of research, and character-

istics of an effective change agent we were forcibly struck by the way in which the role of secretariat fulfills most of the conditions which research studies have shown to be powerful inducers of change.

In effect the secretariat plays the role of an educational technology change agent or to use a more common analogy -- an educational technology county agent. We view this as a potentially powerful role for technical assistance and one of the major justifications of the project.

We have included in Appendix D summaries of what is known about changing behavior and interested readers may compare these with the conditions surrounding the work of the network secretariats. See for example:

- "Ways of Improving the Linkage Between Research and Practice", D-1
- "Organizational Factors Related to Non-Utilization of Research", D-7
- "Stereotyping of Roles", D-8
- "The Tasks of a Change Agent", D-9
- "The Adoption of Social Relations Network for the Adoption of Innovation", D-5

Review of Research Proposals

The problem of determining the relevance and importance of U.S.-generated research proposals related to the field of educational technology in LDC's could be facilitated by circulating them to network secretariats for comments by network members.

Site of the Secretariat

There are strong arguments, pro and con for physically locating a network's secretariat in the U.S. and in an LDC. These arguments will not be reviewed here, pending a closer study of the problem including an assessment of opinions from LDC's.

Qualifications of the Manager of Network Secretariat

The manager needs special qualifications covering several different fields. These are reviewed in Appendix G.

THE EDUCATIONAL TECHNOLOGY INFORMATION ANALYSIS CENTER

Functions

The ETIAC exists to synthesize, analyze, package and disseminate principles, guidelines and generalizations about the uses of educational technology in human resource development in LDC's (see Diagram II, p.29). Although information from other sources would be utilized, the main source of raw data would be the annual output of information from the 5-7 networks representing as many as 50 different programs from perhaps 30 LDC's.

Over time, the amount of comparative data available for analysis would provide a uniquely rich source for generalizing about the uses of educational technology. The ETIAC feeds this information back to the networks and makes it also available to the general public.

The ETIAC also performs these functions:

1. Keeps the networks in touch with one another on matters of interest such as common problems, possibility of joint network training, joint studies, etc.

2. Coordinates requests from secretariats for informational and short-term training technical assistance.

3. Coordinates the activities of the 5-7 network secretariats.

4. Conducts special supplementary studies to obtain data regarding key outside factors relating to development which may not have been identified in network studies.

5. Administers the entire project.

The Analytical Process

The process of analysis will require the development of special standards to meet the requirements of the project. In order to synthesize and generalize data to produce guidelines a high level of evaluative standards is required; critical assessments will need to be made regarding validity of data, soundness of basic assumptions underlying studies, honesty of conclusions and the significance of unreported negative factors and failures.

In the hyper-sensitive field of international networking the problem of standards poses difficult but not insuperable problems. We believe that valuable guidelines with limitations properly stated can be disseminated in ways that protect the integrity and right to privacy of administrators and country programs.

For further description of how typical information analysis centers operate see Appendix E.

Location of ETIAC

We assume that the ETIAC would be based in the U.S. although if the project were to be internationally sponsored within three or more years time, the location could be changed. The ETIAC would be physically located at a non-government, non-

profit institution. Criteria for selecting the location of the ETIAC are listed in Appendix I and examples of existing institutions which fulfill one or more of the criteria are found in Appendix J.

Qualifications of ETIAC Director

The kinds of competencies of the ETIAC director are enumerated in Appendix H.

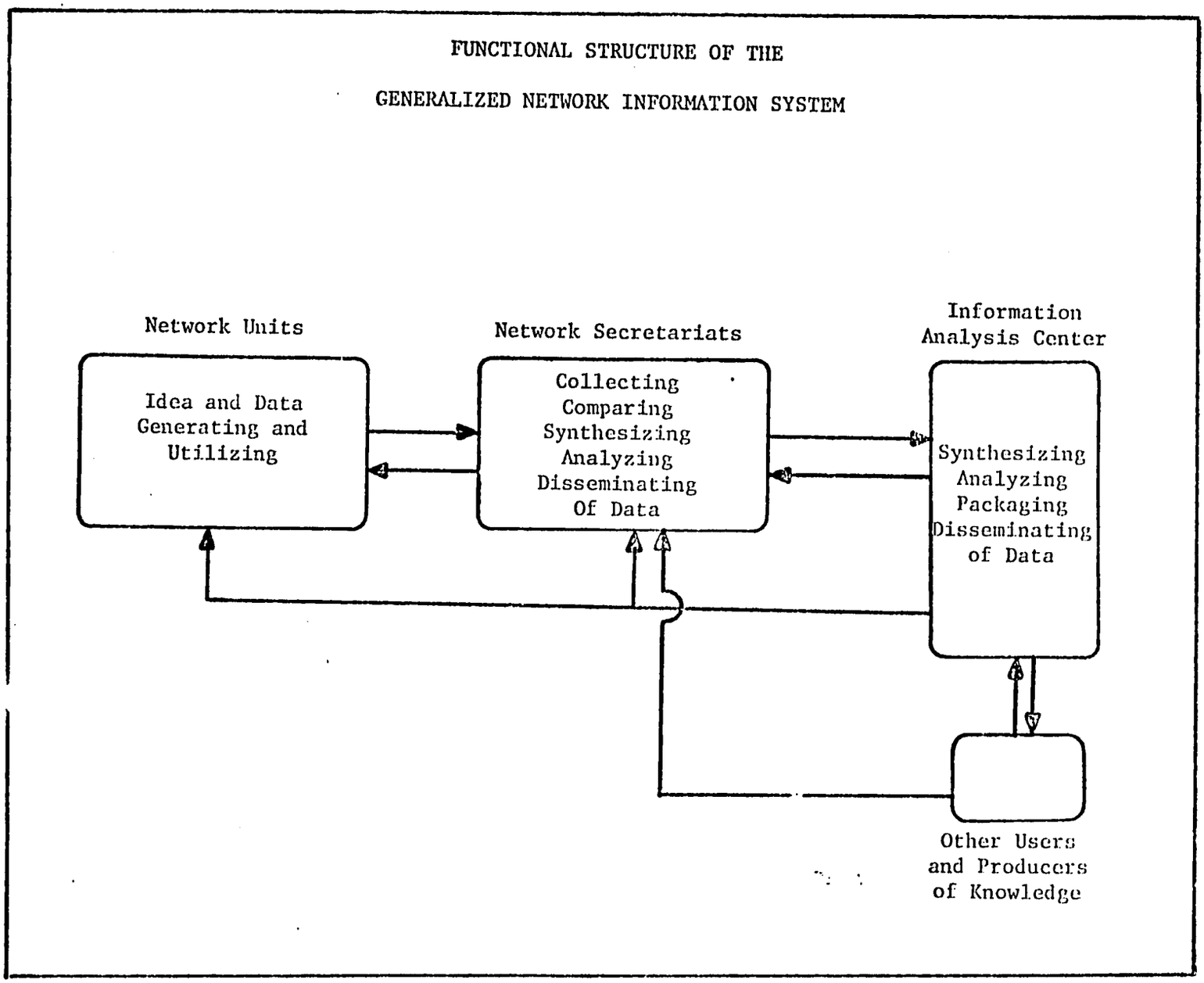

Diagram II: In the process of conducting studies on the problems of operating ITV and radio delivery systems, the network units produce data which is forwarded to the network secretariat. Here it is processed, placed in a comparative framework and fed back to the units. Raw and processed data are also forwarded to the Information Analysis Center which serves all networks. When sufficient data over a reasonable time frame has been collected to permit analyses of activities and their consequences, the I.A.C. extracts principles and guidelines for feedback to networks.

RELATIONSHIP TO UNESCO's INTERNATIONAL EDUCATIONAL REPORTING SERVICE

A.I.D. is providing assistance to the International Bureau for Education's project to establish a world-wide information network for reporting innovations in education (see Appendix B, 7-8 for further details). The project will provide access to information about innovations throughout the world, produce analytical case studies of selected projects and disseminate information about the process of innovation to interested educators.

The networks project is more intensive and narrower in scope. It concentrates specifically on the behavior of a relatively small number of administrators of ITV and radio delivery systems in LDC's and how mutual assistance takes place.

It is therefore process rather than information oriented, although information is an important by-product of the process. It is more concerned with the process of utilization of knowledge and how this is facilitated.

We view the possibility of the network project becoming a special sub-unit of the much larger, more comprehensive IBE project. The Educational Technology Information Analysis Center would constitute the key link between the two projects and a special relationship would be developed to permit information to flow in both directions.

After the networks have matured and interest develops for undertaking large-scale innovations or experiments, the greater

involvement of the IBE project would be important.

PROJECTED STATUS OF PROJECT AFTER ONE, THREE, AND FIVE YEARS OF OPERATION

(based on optimistic assumptions)

First Year

-- First annual workshop convened

-- Results of first cooperative problem-solving project analyzed and steps planned for implementation

-- Short-term training session completed, prior to first workshop, for members of technical staffs of network members

-- Secretariat, having obtained project status reports at initiation of network one year earlier, collects second round of status reports and sends to IAC

-- IAC moves into full time operation with first sets of longitudinal data and completed network studies

-- Original funding still main source of network support but first plans made to involve other funding sources

-- The feasibility of utilizing satellite communications systems for network communication is explored

Third Year

-- Annual workshops convened

-- Network studies are more sophisticated and range from long-term studies involving all members to short investigations among a smaller number of participants

-- Studies increasingly deal with broader aspects of development

-- Intra-network visitation and consultation using mostly local funds

-- Long-term training program arranged by network at a single institution to permit members of the respective technical staffs to train together

-- Sharing of software

-- Network members increasingly asked to provide technical assistance outside of the network

-- Plans adopted for establishing a network software-bank and production unit

-- Division of labor joint projects involving two or more countries underway, especially in software production

-- IAC in full operation

-- International funding now available for larger scale experiments and innovations of significance to the development community. Network members add researchers to their staff

-- Annual workshops now include results of longer term studies

-- Satellite communication between network members has strengthened relationships and has reduced the need to travel. Network workshops concentrate upon more fundamental substantive issues

Fifth Year

-- Regular activities of networks continue.

-- International funding now available for long-term studies and research, necessitating a stable research headquarters. Network secretariat is transformed into a research center comparable to the International Agriculture Research Centers.

-- Network members are now experienced in cooperative problem-solving and are interested and willing to become involved in both applied and basic research activities.

-- Research centers (the former secretariats) are developing firm links to universities and research institutes. Training, planning, research, software production and testing are becoming the main functions of the center.

-- The centers are internationally funded with an international board of directors.

- The Information Analysis Center serves as the key link between individual research centers. Its principal function continues to keep the work of the network units and the research centers in broad world-wide perspective and in contact with other development fields.

- Satellite communications has become a much used means for establishing contact and obviating some necessity for travel and technical assistance. Much data for the research centers can be gathered almost instantaneously from research personnel attached to every network unit.

STEPS TOWARD IMPLEMENTATION

Implementation of the project would proceed through two stages.

Stage One - Preliminary Planning and Convening of International Conference

Stage Two - Establishment & Development of Networks

Stage One - Preliminary Planning and Convening of International Conference

1. Identify important educational technology projects and names of outstanding administrators through contact with USAID's and other international agencies.

2. Survey what is known regarding information needs of administrators of educational technology delivery systems in LDC's through contacting those who have personal knowledge of their problems, especially AID contract grantees.

3. Prepare interview forms and questionnaires for field visits.

4. Conduct field visits to a sampling of likely prospects for networking to:

   a. identify the most important types of problems related to information needs (as opposed to needs for hardware or funds).

   b. tentatively ascertain the types of assistance which could be supplied by professional peers in other countries through networking.

   c. identify the types of roles assigned to administrators and composition of technical staff to help determine how a country could be represented at a network.

   d. identify outstanding professionals who could qualify as good network representatives and could serve as speakers at the international conference.

5. Prepare report on information needs and implications for establishment of networks.

6. Plan conference on educational technology information needs and how these could be met.

7. Convene International Conference.

Stage Two - Establishment & Development of Networks

1. On last day of conference schedule meetings of selected representatives to establish networks and identify useful joint activities.

2. Establish network secretariat and initiate network activities.

3. Establish the Educational Technology Information Analysis Center on one-quarter time operation.

4. After first year, fully activate the ETIAC.

APPENDICES

EXAMPLES OF INSTRUCTIONAL TV AND RADIO DELIVERY SYSTEMS IN LDC's

Initially we had intended to identify and prepare descriptions of potential candidates for each network by reviewing the literature and consulting with knowledgeable persons. This did not prove feasible. As indicated earlier, the information about on-going programs is fragmented, in many cases unreliable, and out of date. Several of our informants described the demise of certain programs and the birth of others; events unreported in the literature.

Rather than report information of questionable validity, we describe a strategy for obtaining current data (see section on Steps Toward Implementation), and list below, as examples, countries where at one time existed the type of program eligible for network membership.

A. Radio in Rural Development

Afghanistan	Korea
Colombia	Malaysia
Ethiopia	Niger
Ghana	Philippines
Guatemala	Senegal
India	Tanzania
Indonesia	Thailand

B. Instructional Radio in Formal Education

Brazil
Colombia
Kenya
Mexico
Sri Lanka
Tanzania
Thailand
Zaire
Zambia

C. Instructional TV or Radio for Teacher Education

India
Jamaica
Kenya
Mexico
Thailand

D. Instructional Television Systems

Brazil
Colombia
El Salvador
India
Ivory Coast
Korea
Mexico
Niger
Samoa

E. Educational Satellites

Brazil
India
Indonesia
Iran (proposed)

EXAMPLES OF NETWORKS WITHIN AID PROGRAMS

We were able to identify a number of networks supported by various divisions within AID. Three of these are of major importance to an educational technology network because of their potential value as models. It should be noted that the term "network" has been applied somewhat loosely to various types of linked projects. The International Agriculture Research Centers, (#1 below) represents AID's best example of a true network in the sense of a web of interconnected activities. Other examples described below represent networks at early stages of development where the major linkages are to one central institution with only minor cross-linkages between units.

Because the International Agriculture Research Center Network has received international attention its important features are described below at some length.

1. The Office of Agriculture assists in the support of the International Agriculture Research Centers, probably the best example of an active, well-organized, adequately financed international cluster of networks in the field of development. The networks, whose goal is to improve agricultural yield in LDC's, focus primarily upon eight centers each specializing in one particular crop or aspect of agriculture. Linked to the centers are other networks of universities and research institutes. Quoting from International Research in Agriculture, Consultative Group on International Agricultural Research, New York, 1974, the research centers are:

-- The International Rice Research Institute (IRRI), Los Banos, Philippines, one of the two oldest international centers and the one which served as a prototype for those that followed;

-- The International Maize and Wheat Improvement Center (CIMMYT), El Batan, Mexico, whose success in developing new strains of wheat and high-lysine maize has already had dramatic impact on developing country production;

-- The International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria, focusing on farming systems for the humid tropics, mostly in Africa, with special attention to the use of tropical soils;

-- The International Center of Tropical Agriculture (CIAT), Palmira, Colombia, a pioneer in effective farming systems for lowland tropical areas of the Western Hemisphere;

-- The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyberdad, India, which stresses farming systems and water conservation methods of particular benefit to small-scale farmers in hot but water-short regions;

-- The International Potato Center (CIP), Lima, Peru, a one-crop institute working to expand potato cultivation in developing areas;

-- The International Laboratory for Research on Animal Diseases (ILRAD), Nairobi, Kenya, one of the newest centers, currently concentrating on immunological methods for controlling two major animal diseases -- East Coast fever and trypanosomiasis;

-- The International Livestock Centre for Africa (ILCA), to be located in Ethiopia, also new, and also working to increase animal production in the developing world through improved animal husbandry techniques.

"The concept of an international center is that it should be international, though situated in one location. It should be owned by and governed by an international board of trustees. Its senior staff should be recruited from the most able scientists in the world without regard to nationality. The host government should make suitable arrangements to enable the center to develop the facilities, including buildings

and experimental farmlands, that it needs to carry out its research program. The center should have among its objectives not only the carrying out of its own research but also the development of strong linkages with national and regional research institutions in other parts of the world, and it should also have responsibility for training research scientists and production workers.

"The international centers have extremely close relations with the countries in which they are situated, and they develop joint research programs with national researchers in the host countries. Most centers are situated near a university with which joint scientific programs and training can be worked out.

"The research on which an international center is engaged is mainly directed to one or more specific food crops and to the development of farming systems of which these food crops are an integral part. IRRI, for instance, researches on rice and on multiple-cropping systems including rice. CIMMYT works on wheat and maize and also has a small but important program on barley. In each of the centers, the research programs are tackled by multidisciplinary teams of scientists including plant breeders, geneticists, soil scientists, agronomists, entomologists, pathologists, and others. Part of the outstanding success which these workers have already achieved in the older established centers is due to the facilities they have for working with an enormously wide range of genetic material. In some programs hundreds of thousands of crosses can be made and tested in a single year. In addition to the development of many crop varieties giving greatly increased yields, attention is paid to food quality, agronomic and fertilizer practices, crop

rotation, maintenance of soil fertility, and in some centers to problems in the mechanization of small farms. All centers have economists as members of their research teams.

"An international center is expected to develop an outreach network which links it with research centers in other countries through programs of assistance or collaboration. The center will build up a library and often provide documentation services for scientific workers in the fields of concern to the center. Conferences, seminars, and workshops are organized to provide occasions when international scientists can meet to discuss findings. Most of the international centers are in the process of building up collections of the world's germ plasm for the crops for which they are responsible.

"The size of the budget of an international center varies according to its scope of work. Centers have needed between $5 and $20 million for developing their buildings, laboratories, greenhouses, experimental farmlands, and housing for staff and trainees. Annual operating budgets are at the level of about $5 million. Because of the need to establish additional international centers once the effectiveness of the first had been demonstrated, the financial requirements grew far beyond the capacity of private foundations to meet them. New funding arrangements became necessary, and the Consultative Group on International Agricultural Research was formed in 1971, after many preliminary discussions among potential donors."

2. <u>The Office of Nutrition</u> (TAB) has developed a number of networks. Nutrition units attached to each of the eight Inter-

national Agricultural Research Centers (#1 above) in effect, piggy-back on an already well-established international networks. The Office of Nutrition supports the secretariat of another network of nutritionists from international agencies concerned with Vitamin A Deficiency. A third network, involving high level nutrition planners at the ministry level in twelve LDC's is important to note because the process by which it was initiated could serve as a model for establishing an educational technology network. The network was established by the following procedure:

a. Staff members from the Office of Nutrition visited LDC's to discover what were the typical problems of concern to nutrition planners. The most common problems turned out to be methodological -- how to initiate programs, evaluate success and produce cost justifications.

b. AID co-sponsored an international conference at MIT for 300 nutritionists and nutrition planners to stimulate an interchange of ideas and to discuss ways in which methodology problems identified by the field visits could be tackled.

c. Representatives from twelve countries were identified as being interested and willing to join a network to take direct action in developing new methodologies for nutrition planning.

d. The Office of Nutrition proposed to the network that the process by which a U.S. contractor had devised a nutrition strategy for Ecuador, be expanded into a manual and utilized as an experimental model for network members.

e. The first meeting of the network convened in the U.S. for two weeks to examine the Ecuador model and to test out the methodology on data from member countries.

f. The next workshop (May, 1975) will deal with each country's experience in utilizing the methodology as well as how to evaluate results of nutrition programs.

The network has been strengthened by the indirect influence of two other types of persons:

-- Middle level workers who receive AID training at on-going MIT workshops and utilize the new methodology.

-- Theoretician economists and model builders who are increasingly showing an interest in assisting nutrition planners. The Office of Nutrition originally convened a small conference of U.S. theoreticians to attract their interest in nutrition planning. This has had the effect of stimulating other theoreticians in LDC's to volunteer their services to network members.

3. The Office of Education and Human Resources (TAB), assists in the support of UNESCO's newly established program for an international network for education innovations. Operating within IBE (International Bureau for Education), the program entitled IERS (International Educational Reporting Service) will address itself to five specific difficulties facing educational reforms especially in LDC's.

First of all, innovators working in isolation in different parts of the world have little access to expert advice from the most experienced professionals and researchers in other countries. Second, there is usually very poor access to new materials for educational reform which have been developed elsewhere, which may only be available at high cost and which may need both translation and adaptation before becoming useful in another setting. Third, resources devoted to documenting and evaluating the change efforts as they are being made are far too limited, so that an innovator is never really sure that the changed state of affairs represents a genuine improvement over the past. Without careful documentation there is no way to record successes and failures in different aspects of a reform and thus no way to learn from one's past mistakes. A fourth difficulty for the would-be innovator is a lack of knowledge of how to manage the process of reform itself. A small amount of research and writing now exists on the subject of the change process in education and other fields. However, most innovators are not aware of this knowledge and thus have not been able to use it to improve their procedures, to identify resistance to change and to predict and overcome difficulties at different stages. Finally, it is evident that, particularly in

developing countries, there is a lack of trained manpower for carrying out the complex tasks of reforms. At the teacher level, at the level of administration within schools and within districts and at the level of national planning and administration there are many thousands of people of good will with much enthusiasm for progressive changes, but in most cases these people entirely lack the experience, the knowledge and the skills necessary to carry out complex reforms.

To help resolve these difficulties the IERS program would engage in three types of activities: data collection and storage; knowledge building, analysis and synthesis; and networking.

Data Collection. The gathering of available documents on innovation from countries all over the world would constitute a basic and continuing function. A wide spread net would be cast in order to capture elusive material from all countries and a system for storage and retrieval would be established.

Knowledge Building. IERS is conceived primarily as an information and not a research service. However, it would produce case studies and integrative analyses of innovation when the need existed. Several times a year it would produce a limited number of analyses-in-depth case studies, comparative and state-of-the-art studies, manuals, and more theoretical documents relating to change processes.

Networking. IERS would establish a broad dissemination system to permit the widest use of its products. Through a variety of procedures, it would attempt to strengthen on-going networks and create new ones to provide world-wide coverage of information exchange.

4. Other Examples of AID Networks

Office of Development Administration (TAB) has assisted in the development of a number of types of networks. Among these are technical assistance to regional institutions and through them to a network of local country projects; and the organized sharing and international exchange of information, knowledge and resources in the field of agribusiness.

Office of Science and Technology (TAB) assists in maintaining a network of developing countries with headquarters at the Denver Research Institute. Activities include training and exchange of technical information.

Office of Population (PHA) assists in bringing together U.S. and international agencies involved in population control activities, to facilitate a communications network.

Office of Development Services (Africa) is involved in establishing an African network of rural development project managers and working level planners who are dealing with out-of-school education.

Office of Education and Human Resources (TAB) is proposing a type of organization which would have the potential for extensive networking. Although not yet funded, AICHER (Association for International Cooperation in Higher Education and Research) would link U.S. and LDC universities in collaborative activities of mutual benefit.

EXAMPLES OF NON-AID RELATED NETWORKS IN EDUCATION

Although there are numerous examples of informal collaboration between educational planners, researchers and program operators, especially among the activities of professional societies with international membership, we found few examples of more formally organized networks in the field of education and specifically, educational technology. However four of these examples are as follows:

1. INNOTECH CENTER, SEAMEO Regional Centre for Educational Innovation and Technology (39 Newton Road, Singapore 11) was organized by the Southeast Asian Ministers of Education Organization. The goal of this fledgling organization is to assist its seven member states in the identification and resolution of their basic educational problems and to undertake training programs, research and experimentation, publications, and other kindred activities throughout the region. The name INNOTECH is an acronym for "in novation" and "technology."

2. UNESCO Regional Offices for Education. Each of the four regional offices in Africa, Arab States, Asia and Latin America promotes a variety of activities to increase communication between educators of the respective regions. However, the kinds of activities promoted by the regional offices and the degree of vigor with which these are pursued fluctuates so markedly that it is difficult for an outsider to judge the overall effectiveness of these networks.

3. UNESCO Division of Methods, Materials and Techniques. In collaboration with ICEM (International Council for Educational Media), the Division has recently organized the "Working Group on Information Exchange on Technical and Economical Studies Related to Educational Technology."

The Group's first action was to identify and abstract 200 studies dealing with educational technology for an international inventory. Other activities planned include the following: an international publication devoted to research findings; a network mechanism to permit continuous international exchange of ideas regarding research; and an attempt to standardize research methodology and harmonize differences in research technique to ensure a certain level of comparability.

4. ICET (International Council on Education fon Teaching. ICET is an international association of institutions, organizations and individuals concerned with the preparation of teachers. Its membership covers 72 countries, 52 of them in the category of "developing countries." Its objectives are to define and explore ideas and principles underlying the education of teachers and to promote opportunities for international consultation and collaboration. The world headquarters of ICET is in Washington, D.C., at the national offices of AACTE (American Association of Colleges for Teacher Education). A world assembly of members meets once a year in different locations.

NOTES ON UTILIZATION OF RESEARCH

RESULTS: Distillation of Principles

ys of Improving the Linkage Between Research and Practice

From: National Institute of Mental Health, Planning for Creative Change in Mental Health Services: A Distillation of Principles on Research Utilization, Vol. 1, NIMH, 1973

A. Collaboration Between Research Scientists and Practitioners Enhances Knowledge Utilization.

The Collaboration of research scientists and practitioners in joint research projects appears to provide the greatest potential for maximum utilization of research findings. The strength of this potential stems from the fact that successful collaboration optimally results in research findings which are not only immediately available and understandable to the practitioner, but are relevant to the realities of the practice situation...

Of primary importance is the identification and development of a research problem which reflects the interests and concerns of those affected by the research project. Maximal utilization is likely to occur when researcher and practitioner interests are parallel, such as when both share a humanitarian concern for a client group.

Another basic principle is that practitioners should be involved in all phases of the research. Once an area of research need is identified, the collaboration should continue

through problem formulation, study design, data collection, interpretation of findings, and application of the results. Not only can the practitioner make significant contributions to each of the research phases, but also effects participation of the eventual beneficiaries of research in its design, conduct, and evaluation. Those who have a significant part in planning and decision-making are not only better informed but are more committed to making use of findings.

An important consideration is the need for the research team to contain a representative of the agency's top management. The person representing administration must have policy-making power.

Frequent honest and open communication between researchers and practitioners reduces the likelihood of the emergence of stumbling blocks in the study and enhances the chances that research findings will be put to use.

Another important step in preventing the development of later problems is early clarification of practitioner and administrator expectations of the research. It is important for the researchers to make clear to the practitioners at the beginning that the outcome will not be clear dicta on how they should run the organization.

Research is also more likely to proceed smoothly when there is a very explicit understanding before starting the project between researchers and agency administrators regarding reciprocal responsibilities.

B. Kinds of Communication Affect Research Utilization

1. Improved Reports

While printed reports are the main outlet for the research fraternity, there is little assurance that these are read by many practitioners. Doers may not be readers.

Research reports are seen as more useful if they are brief and readable. The vocabulary of the specialist needs to be translated into lay language. The same finding has more impact if it reaches the practitioner several times in slightly differing forms.

A report is more effective if it focuses directly and explicitly on a decision which the professional or manager must make. It is important to get the right bit of information to the right person at the right time.

2. People to People

Most practioners learn mainly from face-to-face contact with other people. They learn most readily from "influentials" in their profession; from persons with contagious enthusiasm; and from those with whom they feel easy rapport.

3. Demonstrations and Visits

Many innovations are most convincing when demonstrated. One suggestion is that the added cost of such a demonstration project be built into the funding of a research proposal. It has been found, however, that most observers

who visit and admire radical innovations of experimental schools and colleges do not adopt them. They see their own situation as basically different. Visits to situations very like those in which the visitor works back home, but where something new is being done, have greater transfer value. A site visit engenders enough advocacy so that the visitor will often aggressively sponsor the innovation when he gets back to his home agency. Exchange of professional workers would facilitate this kind of diffusion, as would more released time and travel funds.

In 1965 a traveling seminar was arranged by the System Development Corp. for 120 educators. After visiting schools where various innovations were in operation, the tour members had a day together to review, discuss, and generalize their observations. The project was evaluated by visits 1 year later to the schools conducted by these educators. In comparison with plausible control schools, the tour participants had introduced many more innovations.

4. Conferences

Personal contact between potential users and innovators may be a crucial condition for the optimal dissemination of new ideas.

Conferences in which research reports are presented and discussed with practitioners are more influential than publications or other one-way reports.

The effectiveness of conferences would be enhanced by advance distribution of papers to be presented to interested participants.

Conferences have a two-way impact. Practitioners face up to the implications of research findings but researchers also profit from the feedback from those who would like more practical assistance.

C. Middlemen Can Facilitate Research Utilization

The attitudinal and communication barriers between researchers and professional practitioners may prevent new ideas from coming through in a usable form. It is to overcome these obstacles that a new "middleman" function is, to an increasing extent, being utilized.

Common to most of the job-portraits of the middleman is an analogy with the outstanding achievements of the county agent in linking agricultural science to farm practices. Earlier attempts to improve farming by well-edited bulletins and excellent State College demonstration farms did not bring much change in the practices of the average farmer. The genius of the county agent was that he lived close to his clients and ran the kind of homey local demonstration projects which utilized well-known and well-trusted neighbor farmers.

The notion of the change agent is moving away from that of the agent as the conveyor of new facts, innovations, and research, as in the country agricultural agent model, toward

a concept of the agent as consultant, facilitator, and catalyst. This would imply that the middleman would be serving much broader objectives than simply the spread of information and its linkage to practice.

The job of the change agent, then, would appear to be difficult and demanding. The competence of the change agent should encompass: Conceptual diagnostic knowledge cutting across all behaviorla sciences; knowledge of theories and methods of organizational change; knowledge of sources of help; orientation to the ethical and evaluative functions of the change agent's role; possession of operational and relational skills; recognition of his own motivations.

D. Factors That Influence Utilization Success

1. Linkage - reciprocal relationships between resource and user systems.

2. Structure - resource system must plan its activities in a structured sequence, and user system must be organized to receive input.

3. Openness - resource system must be willing to be influenced by user needs and expose its new knowledge to inspection; user system must actively reach out for new ideas.

4. Capacity - both resource and user systems need the amount of wealth, intelligence, etc., needed to deal with a given innovation.

5. Reward - both resource and user systems need kinds of positive reinforcement or benefits from the innovation to warrant the investment of time, money, and effort.

6. Proximity - proximity facilitates linkage.

7. Synergy - several inputs of knowledge, working together over time, through different channels and formats (purposeful redundancy) facilitate adoption.

II. Organizational Factors Related to Non-Utilization of Research

From: Weiss, Carol, "Utilization of Evaluation: Toward Comparative Study". Paper Presented at the American Sociological Association Meeting, Miami, Florida. 1966 (mimeo).

What accounts for the high rate of non-utilization of research? The first class of factors leading to non-utilization lies in the organizational systems that are expected to use the results. Organizations invariably respond to factors other than the attainment of their formal goals. Even rudimentary knowledge of organizational behavior indicates the salience of the drive for organizational perpetuation, personnel's needs for status and esteem and their attachment to the practice skills in which they have invested a professional lifetime, conservatism and inertia and fear of the unknown consequences of change, sensitivity to the reactions of various publics, costs, prevailing ideological doctrines, political feasibility, and the other considerations that affect the maintenance of the organization. Evaluation's evidence of

program outcome cannot override all the other contending influences.

What evaluation can do is add its weight to the thrust for change. Few organizations are so monolithically self-satisfied that counterpressures do not exist. Most of them face some discrepancy between the ideal and the actual that generates a search for better ways of operation. (This discrepancy sometimes provided the impetus that lead to embarking on evaluation in the first place.) There is at least a potential for utilization. But rather than ignore the forces that tend to subvert the implementation of evaluation results and trust in the good will and rationality of the organization, evaluators might well pay greater attention to the organization-maintance imperatives that influence decision-making, perhaps even address the covert goals as well as the formal goals of the organization.

III. Stereotyping of Roles

From: Baldridge, V.J., et al., "The Relationship of R & D Efforts to Field Users: Problems, Myths, and Stereotypes". Phi Delta Kappan, p. 701-706, June, 1974.

The Realities and Myths Separating Researchers and Field Users

A real difference in:	Is blown into a stereotype:
Time perspectives: Researchers are looking for long-term payoff, while field users need solutions to immediate problems.	Researcher = "1984" dreamer Field user = short sighted person

Experimental control: Researchers need to control as many factors as possible, while field users must deal with full complexity of ongoing situation.	Researcher = unfeeling manipulator, data shuffler, computer-bound robot Field user = do-gooder; fuzzy and emotional thinker
Problem definition: Researchers are seeking to prove basic social science propositions, while field users want daily practical problems solved.	Researcher = head-in-clouds, ivory-tower intellectual Field user = nonintellectual, nose-to grindstone peon
Policy orientation: Researchers try to design efforts to affect general social policy, while field users want more local issues addressed.	Researcher = theoretical world-changer Field user = user of stop-gap measures, with Band-aid mentality

IV. The Tasks of a Change Agent

From: National Institute of Mental Health,
Planning for Creative Change in Mental Health Services: A Manual on Research Utilization.
NIMH, 1973

Almost every scholar who has written about the management of planned change has enumerated the phases through which the process passes and the specific tasks of the change agent with respect to each phase. From among them, the following are presented as being particularly practical and functional from the point of view of the change agent.

1. Diagnosing (or clarifying) the client's problems.

   The change agent May:

Take cognizance of existing program evaluation and/or management information systems; or guide development of evaluation or monitoring systems.

Obtain information by direct questioning, by seeking it from neighboring systems, by demonstration (of problem), or by participant-observation.

Process information by acting independently and cooperatively, and by encourageing client self-analysis.

Stimulate understanding and acceptance of diagnostic insights.

2. Stimulating the problem-solving process.

Encourage staff to retain responsibility for selecting solutions, avoiding the giving of direct advice and decision-making for the staff on related matters.

Guide staff in establishing goals and tentative intentions of action.

3. Taking cognizance of the organizational climate and attributes relevant to change.

Determine whether:

-- the organization is so large that inflexibility may pose a problem

-- the organization has too few resources to back-up the change

-- it is so threatened with survival problems that it cannot afford to change

-- it is over-receptive to change because it feels it has nothing to lose

-- it is so hierarchical and tightly organized that innovation will be improbable

-- it allows existing practices to be challenged without fear of recrimination

-- it is under pressure from the community or limited by legislative constraints

-- its staff morale and cohesiveness are sufficient to launch change efforts

-- the organization leadership is bold enough to risk a change and secure enough to be open about staff participation in change

4. Assessing readiness for change.

Determine the urgency and source of the felt need for change -- discern whether the pressures come from outside the organization as through competition or public opinion; or whether they are internal pressures stimulated by employees who are either dissatisfied or wish greater sense of accomplishment for their efforts.

5. Developing a need for change.

Heighten the client's sensitivity to specific problems, if necessary by ... using confrontation techniques; using the system's more sensitive, or its more influential persons.

6. Establishing a change relationship.

Assess the client's capacity to accept and use help.

Assess the client's motivation to accept and to use help.

Obtain a mutuality of expectation for the change

relationships in terms of how much time will be required and how many people will be involved.

Clarify expectations about the kind and amount of work required.

Anticipate difficulties which might emerge in the change relationship.

7. Preparing tactics for change.

Determine the resources that will be required to support the change, both in terms of training, funding, and authority.

Ascertain that the change is consonant with the values of the clients, staff, and supporters of the program; plan modifications of the change to render it compatible with the organization.

Design method and materials for communicating information about the change idea to all relevant persons.

Assess needs for modification of prevailing circumstances to ensure optimum accommodation of the change; identify the point of entry.

Select a time for entry based upon approaching crises, activity cycles of the organization, social or political issues relevant to the change.

Reexamine the organization's need for the change and ensure its awareness among all relevant parties.

Anticipate all probable resistances, giving special regard to those who will be personally less well-off

after the change or whose values are violated by the change; plan ways of easing the stress for such persons.

Compile and communicate cogent information about the anticipated benefits of the change, both in terms of program goals and personal benefits to individuals involved.

8. Enlisting the participation of those most affected by the change.

Ensure, insofar as possible, that the participants in the change have an opportunity to identify their needs themselves.

Provide an opportunity for persons affected to take part in working through details of how the innovation will be applied to their work setting.

Facilitate open, unstructured feedback of participants after the idea of the innovation is first presented and described.

9. Summoning and developing resources.

Make final plans for budget accommodation and handling of product-losses that may occur as a result of the innovation.

Ensure the backing of authority for the change.

Plan orientation and training programs for persons affected by the change.

10. Employing appropriate methods of change.

11. Evaluating the consequences of the change.

Guide client in preparing for evaluation of the goal and system impact of the change.

Plan for method of feedback and response.

V. Non-Utilization of Educational Research

From: Bloom, Benjamin, "Twenty-Five Years of Educational Research". American Educational Research Journal, May, 1966.

"As President of the American Educational Research Association I have been trying to take stock of what we have accomplished during the past quarter of a century. Such stock taking tells as much about the person doing the inventory as it does about the field ... approximately 70,000 studies were listed in the Review of Educational Research over the past 25 years. Of these 70,000 studies, I regard about 70 as being crucial for all that follows. That is, about 1 out of 1,000 reported studies seem to me to be crucial and significant, approximately 3 studies per year. It is likely that a somewhat more relaxed criterion would increase the number of studies regarded as crucial by the order of 3 times the present list. I doubt if anyone would increase the list as much as 10 times. Even with the threefold increase, this would mean no more than 9 crucial studies a year (out of approximately 2,500 per year). Perhaps this is all that we should expect in educational research, and it may be about the level expected in any field of research. However, it is my opinion that we need much more in

education, and I am confident that we can get a great deal more if we are willing to make the effort and if the proper research strategies are available to us."

VI. The Importance of a Social Relations Network for the Adoption of Innovations.

From: Havelock, Ronald, Planning for Innovation Through Dissemination and Utilization of Knowledge, Ann Arbor, University of Michigan, 1969.

The fact that individual human beings are embedded in and inextricably connected to a social network made up of other individuals may seem obvious enough to most of us, but it is a fact often ignored by R & D-oriented policy makers when they assume that the best innovations diffuse by themselves or when they assume that new ideas can be conveyed successfully through publications or other mass media alone. The user must make contact with the outside resource system and interact with it so that he will get back something relevant to help him with the solution process. The user must enter into a reciprocal relationship with the resource system; this means that something must be going on inside the resource system that corresponds to what is happening in the user. The development of reciprocating relationships goes beyond the point of improving individual problem-solving processes toward the creation of a stable and long lasting social influence network. This collaboration will not only make a solution more effective, but, equally important, it will build a more effective relationship -- a relationship of trust and a perception by the user that

the resource is truly concerned, that the resource will listen, and will have a quantity of useful information to pass on. The reciprocal and collaborative nature of this relationship further serves to legitimize the roles of consumer and resource person and it builds a channel from resource to user.

NOTES ON THE INFORMATION ANALYSIS CENTER

(A proposal model for an Educational Technology I.A.C. for Developing Countries)

From: Weisman, H., Information Systems, Services and Centers. New York, Becker and Hayes, Inc., 1972.

DEFINITION

Information analysis centers may seem costly but, at least in theory, are the most efficient systems for transferring to a user timely, authoritative, evaluated information in a convenient form. In an era marked by constant expansion of scientific and technical literature, it is apparent that users want the data and information contained in the literature and not the documents themselves. As Branscomb (18) once graphically observed, "It is just as absurd for the user to tap the total collection of raw material for his data as it would be for the jeweler to order six tons of gold-bearing ore when he wants to make a cuff link." The strategic role in this refining operation has been particularized in the oft-quoted Weinberg Report (136):

> . . . retrieval of documents is not the same as retrieval of information; a technical specialist really needs the information contained in the published literature, not the published literature itself. To retrieve information, as contrasted to documents, the technical community has devised the specialized data and information [analysis] center.
>
> Specialized information [analysis] centers, to be fully effective, must be operated in closest possible contact with working scientists and engineers in the field. The activities of the most successful centers are an intrinsic part of science and technology. The centers not only disseminate and retrieve information; they create new information . . . . The process of sifting through large masses of data often leads to new generalizations . . . . In short, knowledgeable scientific interpreters who can collect relevant data, review a field, and distill information in a manner that goes to the heart of a technical situation are more help to the overburdened specialist than is a mere pile of relevant documents. Such knowledgeable scientific middlemen *who themselves contribute to science* are the backbone of the information [analysis] center; they make an information [analysis] center a technical institute rather than a technical library. The essence of a good technical information [analysis] center is that it is operated by highly competent working scientists and engineers, people who see in the operation of the center an opportunity to advance and deepen their own personal contact with their science and technology . . . [they are] dedicated and knowledgeable technical men who help interpret and assimilate the literature for others working in the field.

An information analysis center is a formally structured organizational unit specifically (but not necessarily exclusively) established for the purpose of acquiring, selecting, storing, retrieving, evaluating, analyzing, and synthesizing a body of information and/or data in a clearly defined specialized field or pertaining to a specific mission with the intent of compiling, digesting, repackaging, or otherwise organizing and presenting pertinent information and/or data in a form most authoritative, timely, and useful to a society of peers and management.

CHARACTERISTICS:

The key activities are the analysis, interpretation, synthesis, evaluation, and repackaging of information for the purpose of enabling users better to assimilate the information or numerical data of a specific field.

An information analysis center uses subject specialists to perform the analysis, evaluation, or synthesis.

An information analysis center produces new, evaluated information in the form of critical reviews, state-of-the-art monographs, or data compilations and usually provides substantive evaluated responses to queries.

An information analysis center provides assistance to a community of users and not just assistance to "in house" personnel.

. . . The input material is examined by a specialist in the field, analyzed in appropriate ways, and conclusions are drawn that represent new knowledge that did not exist before. This creation of new knowledge is essential if an activity is to be designated an information analysis center. Reorganization of existing knowledge into new formats is not sufficient. The center must produce critical reviews, critically evaluated data compilations, correlations between various types of data, or some other product of intellectual effort that is recognized as a contribution to new knowledge. Much of the product of some centers represents a distillation of the reusable results of many reports; in effect, a compression of the literature into a smaller volume.

FUNCTIONS, ACTIVITIES, AND PRODUCTS

The functions, products, and services of information analysis centers vary in detail, vary in accordance with the needs of its user population, but are, on the whole, similar. Operationally, IAC's function like other information services/centers. The accompanying figure, borrowed from Brady (16) shows the sequences of operations and possible products of IAC's.

The left hand column indicates activities, while the right hand column shows the type of products that may result from the corresponding activity on the left. The first step--true also in all information service/centers--is the selection and acquisition of relevant documents. This may yield a comprehensive but unevaluated archival bibliography. The next step is abstracting and/or indexing the documents. This process often consists of assigning key words to each document to identify the data or information. An indexed bibliography becomes a more useful document, since it can indicate to a user exactly the type of data contained as well as parameters of data points. The next phase consists of selective extraction of chunks of information, such as quantitative data, description of methodologies, interpretations, and other material necessary for the ultimate utilization--evaluation of the content. The products resulting from this phase might be an unevaluated compilation of data or a descriptive review, sometimes also referred to as a state-of-the-art review. The descriptive review is a selective extraction of information from the literature on some particular subject; the selected material delineates the literature's status and character. Some state-of-the-art reviews go beyond the description of "who did what and what happened" and offer some evaluation, but, on the whole, descriptive reviews are summaries of the activities described in the literature for a set period of time, usually a calendar year. Uncritical data compilations can be a useful product in that they provide a handy, time-saving amalgamation in a convenient format.

These products are prerequisites for the fundamental function of the IAC. This function is the intellectual activity, falling under the general rubric of analysis that results in the creation of new knowledge. The new knowledge takes the form of the products noted in Figure 1--critical reviews, critical data compilations, criteria, recommendations, solutions to problems, correlations, and predictions.

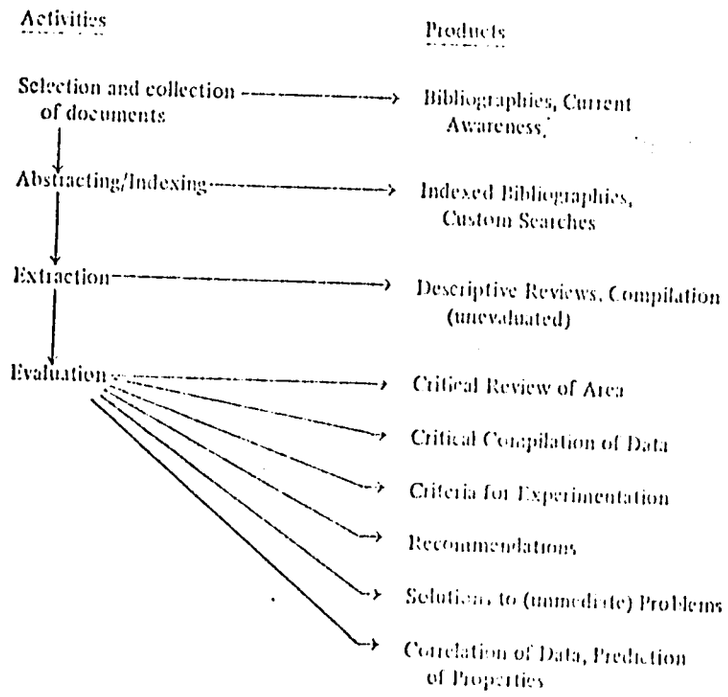

Figure 1. Activities and products of information analysis centers.

THE EVALUATION PROCESS

The term, "critical" is qualitative; it has the dictionary meaning of exercising or involving careful judgment or judicious evaluation
a scholarly observer of the information analysis center activity, has examined the evaluation function. His opinion is that sophisticated, mechanized retrieval systems do little for the user in his quest for reliable information except to offer speed and some convenience in operation: "Asking a question of a data bank is simply having a machine open the handbook to the proper page. It does not improve the data. The evaluator must do that."

Garvin offers an analogy to help explain the scholarly activity of evaluation. He finds it similar to the examination of eyewitness accounts of an event. First, he says, it must be determined that the witnesses are describing the same event. Then it is necessary to find what is common and what is conflicting in their accounts. Finally, an attempt must be made to develop a consistent statement of what occurred. Then, Garvin cautions, the evaluator must keep in mind at all times the possibility that a new witness, perhaps armed with a well-focused camera, may report in with different evidence. The evaluator, concludes Garvin, is always out on a limb.

Evans and Garvin (46) have examined the type of information evaluators need in order to establish the reliability of the data in a paper:

Description of apparatus with dimensions (either directly or by reference to earlier work).

Calibration of equipment, including a discussion of the magnitudes of possible systematic biases for which corrections were not made.

Experimental procedure.

Environmental conditions.

Identification of analytical methods used (and proof of them if novel).

Purity of materials and how determined.

Statement of sensitivity or resolution on all of the above.

Explanation of the method used to reduce the data.

Assumptions made in deriving the results.

Auxiliary data used including explicit statement of their values.

Numerical factors that relate the units used in reporting the data to the fundamental units of measure.

Reports on negative results.

CRITERIA FOR ESTABLISHING AN IAC

1. There is a growth in the world-wide literature such that the community of users cannot assimilate it.
2. There is incompatibility in the data of the world-wide literature.
3. There are problems in the subject field or mission which are not readily solved.
4. The community of users are frustrated by the situation represented by items 1-3.
5. There is in existence a funding source or agency interested in resolving these difficulties.
6. Subject specialists are available who can try to resolve them on a continuing basis.
7. The benefits accruing outweigh the costs involved.
8. A research laboratory or its equivalent is available to serve as the host environment for the IAC.
9. Another IAC is not already in existence that might provide the required IAC services.
10. Preparation of evaluative products is practicable.
11. Competent management and staffing are available.
12. A close relationship is available to the proposed IAC with the generators of the information and the community of users.
13. Competent funding is available for a minimum of three years through direct support and/or through the sale of services and products.
14. Competent overseeing is available by the support agency and by an advisory or review panel.
15. There is a likelihood that a realistic system of user charges can be set up that will be acceptable by the support agency and the user community.

Selected Examples of I.A.C.'s in the U.S. (estimated to total over 100)

Atomic Energy Commission I.A.C.
Educational Resources Information Center (ERIC)
National Standard Reference Data Center
Department of Defense I.A.C. (22), etc.

LIST OF INTERVIEWS

George Armsey
Ford Foundation

Guy Baird, Associate Director, (Research)
Office of Agriculture/TAB

Curt Barker, Special Assistant for University Relations
Technical Assistance Bureau

Joel Bernstein, Consultant, Formerly Director
Technical Assistance Bureau/AID

James Chandler, Director
Office of Education and Human Resources TAB/AID

Philip Coombs, Vice President
International Council of Educational Development

Martin Forman, Director
Office of Nutrition TAB

Shigeenari Futagami, Mass Media Specialist
World Bank

Eleanor Green, Chief Education Officer of Technical Development
Bureau for East Asia

Stanley Handleman, Deputy Chief-Educational Planning
NESA

Charles Haughey, Head
Communication and Linkage Unit, NIE/USDE

John Hilliard, Consultant to AID, formerly Director
Office of Education and Human Resources TAB

Robert Hilliard, Chief
Education Broadcasting Branch, F.C.C.

Robert Johnson, Senior Education Advisor
Africa Bureau

Frank Klassen, Associate Director
American Association of Colleges for
Teacher Education

Michael Neben, Senior Program Officer
Division of Technology USOE

Willis Schaeffer, Social Science Analyst
Office of Research an Institutional Grants/TAB

Seth Spalding, Professor
International Development Education Program,
University of Pittsburgh

SKILLS AND KNOWLEDGE REQUIRED BY MANAGER OF A NETWORK SECRETARIAT

1. Knows the problems of administrators of ITV and radio delivery systems in LDC's.

2. Knows the problems of communication in LDC's and how to build and maintain network linkages.

3. Knows how to involve others in cooperative problem-solving, joint studies and feedback activities.

4. Understands general problems of development and is able to relate problems of administrators to larger, integrated goals of development.

5. Understands the needs for training and how to respond to various needs for short term training courses.

6. Cooperates with the IAC in facilitating a two-way flow of data and assists the IAC to identify key factors that should be part of the analysis process.

SKILLS AND KNOWLEDGE REQUIRED BY AN ANALYZER IN THE I.A.C. FOR EDUCATIONAL TECHNOLOGY IN LDC's

1. Knows the information needs of administrators of ITV and radio delivery systems in LDC's as well as information needs of researchers, international agency personnel and scholars.

2. Understands the uses and limitations of data derived from network field studies and is able to apply high standards of honesty and integrity to the process of analyzing network data.

3. Possesses finesse in balancing the public's desire to know the details of development projects against the rights of individuals and organizations for privacy concerning potentially embarrassing disclosures.

4. Communicates with network secretariats and other professionals in the field of educational technology and development.

5. Possesses broad knowledge of development and the ability to analyze educational technology projects in a broad framework of development; elicits the cooperation of other development specialists when necessary.

6. Possesses the administrative skill to manage the project through the work of each network secretariat and the staff of the Information Analysis Center.

CRITERIA FOR SELECTING A LOCATION FOR THE EDUCATIONAL TECHNOLOGY INFORMATION ANALYSIS CENTER (ETIACDC)

1. Proximity to international media specialists, international development educators, and other development specialists to permit time-sharing arrangements for obviating total reliance on consultant fees.

2. Proximity to research scientists in the field of international media, education and other development specialties.

3. Proximity to existing clearinghouse or library collections on educational technology and development.

4. Previous experience in working with administrators and professional staffs of media delivery systems in LDC's.

5. Previous experience in dealing with educational media systems researchers.

6. Demonstrated interest and understanding of role of an information analysis center as broker between producers and users of information derived from field studies.

7. Non-governmental, non-profit organization.

EXAMPLES OF NON-PROFIT ORGANIZATIONS WHICH FULFILL SOME OF THE CRITERIA FOR ESTABLISHING AN EDUCATIONAL TECHNOLOGY INFORMATION ANALYSIS CENTER (ETIAC)

U.S.

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS (NAEB)
1346 Connecticut Avenue, N.W., Washington, D.C. 20036

Serves professional needs of educational radio and television stations, systems and personnel. NAEB staff analyzes, studies, and reports to its members on such matters as program practices, community antenna television, instructional applications, and funding of noncommercial radio and TV. Participates in developing rules and regulations for the industry and speaks for the future needs of educational broadcasting. Develops and manages projects and grants for professional services in the U.S. and overseas.

ACADEMY FOR EDUCATIONAL DEVELOPMENT (AED)
680 Fifth Avenue, New York, New York 10019
and
1414 22nd Street, N.W., Washington, D.C. 20037

Assists universities, schools, and government agencies in planning for improving operations and programs. Plans programs in mass communications, higher education management, instructional technology, international education, as well as planning and management of contract teams overseas. The Information Center on Educational Technology provides information on education technology to LDCs, AID and other professionals in the U.S.

AMERICAN INSTITUTES FOR RESEARCH (AIR)
Box 1113, Palo Alto, California 94302
and
Foxhall Square - 2nd Floor
3301 New Mexico Avenue, N.W.
Washington, D.C.

Conducts research on educational systems, individual differences, use of psychometric instruments as tools in prediction and guidance, as well as evaluation of instructional programs involving media both in the U.S. and LDCs.

ASSOCIATION FOR EDUCATIONAL COMMUNICATIONS AND TECHNOLOGY
1201 16th Street, N.W. , Washington, D.C. 20036

Supports leadership development activities in educational communications and technology. Conducts leadership training programs for professionals, disseminates knowledge developed in the field, conducts related research, and evaluates current programs and activities.

FLORIDA STATE UNIVERSITY - TALLAHASSEE, FLORIDA
Tallahassee, Florida 32306

Develops the uses of educational technology in developing societies through the Center for Educational Technology. Activities include training programs for Latin American educators, the development of educational technology systems in LDC's development, research projects and publications.

STANFORD RESEARCH INSTITUTE (SRI)
Menlo Park, California 94025

Conducts research projects, some related to the media especially in telecommunications and economic aspects, spectrum utilization, and earth-station siting of domestic communications satellites. SRI has conducted overseas research in the general field of human resource development.

STANFORD UNIVERSITY
Stanford, California 94305

Conducts research on uses of educational technology in the U.S. and LDC's. Conducts training programs for specialists from developing countries on evaluation and research in the field of educational technology.

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