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AUTHOR DeHart, Florence E.
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ABSTRACT

Media service is explored as a disciplinary application of general systems science. Media service for the nonresearcher, for the practitioner in the behavioral sciences, and for the professional researcher is examined from the premise that the media specialist generates and performs media service in an interventionist, advocacy role. The design of a program for educating media specialists is also proposed. (SK)

Media Service as a Disciplinary Application of General Systems Science

Florence E. DeHart

OBJECTIVE

The objective of this paper is to explore media service as a disciplinary application of general systems science. Media service for the non-researcher, for practitioners in behavioral science areas, and for the researcher will be explored. These service recipient groups are differentiated here somewhat artificially for ease in treatment. The paper concludes with the design of a program for educating media specialists.

The particular perspective of the media specialist role to be developed below was derived from my patterning a current trends course in a library school around the following work: Havelock, Ronald G., Planning for Innovation through Dissemination and Utilization of Knowledge (Ann Arbor, Mich.: Center for Research on Utilization of Scientific Knowledge, 1971). I made explicit that dissemination and utilization (D&U) of knowledge includes the origin, production, control (in the sense of knowing what is available), and evaluation of the efficiency and effectiveness of the total process of knowledge exchange. Knowledge was taken to include information also, represented in any format. Hereafter, "D&U"

will be used to represent the total knowledge exchange process. I also enlarged on the tenor of the Havelock volume to include maintenance knowledge, as well as new knowledge in a field and knowledge new to the recipient.

Inherent in the course was a dual approach: (1) taking the Havelock outline as representing the library and information science field, and tracing how these fields handle the macrosystem of maintenance and new knowledge exchange through the stages of pure research, development, and consumer use; and (2) taking the outline as representing subject fields and ascertaining how library and information science serve, or could serve, each step of the process of knowledge exchange in these fields.

From this dual analysis emerged the concept of a media specialist who generates and performs media service as a disciplinary application of general systems science in an interventionist, advocacy role. From a wide range of employment bases, including possibly a resident position at a media institution (library, information center, learning resource center, or whatever other name a source agency might utilize), media specialists would perform services from media institutions with which they were affiliated. Two far-reaching considerations raised in the Havelock volume primarily influenced this conclusion. First, the deficiencies pointed out in the current state of affairs in the field of education suggest an advocacy role for the media specialist in determining to what extent and with what consequences these deficiencies exist in the library and information science field and how they might be remedied (p. 3-35). The deficiencies follow: there is a gross underdevelopment

of the dissemination and utilization (D&U) macrosystem component of research and development; there is an inadequate appreciation of consumption as a system component; and there is very little shared understanding among all components (research, development, consumer) of their mutual relatedness and interdependence in a D&U macrosystem. Second, the challenge presented by Havelock (p. 11-33) concerning what he calls the great technical achievements of our time in information processing and transmission is crucial: He suggests that we are living in a pseudo-technological environment surrounded by sophisticated equipment performing trivial tasks and standing idle most of the time. He supports his overall systemic approach toward D&U in his comment that without the software and without extensive further development at the user interface, there is no way of knowing what the potential of these new mechanisms of television, audio and video taping, and computerized information processing will be. This important but unresolved issue, as he calls it, demands a scope of operation with strength in intellectual and attitudinal preparation that suggests the perspective of media specialist service developed below.

DEFINITION OF TERMS

Major terms will be defined, but the full import of the definitions will probably come fully clear only as the paper proceeds to grapple with how the concepts would be applied in practice.

Media

"Media" is taken very broadly to include all formats and their content, including knowledge and particular items of information, as well as referral resource lists.

Media Service

"Media service," in contrast to the usual connotation of school media service, is defined far more broadly here as the process and product of the media specialist as he generates and provides media, as defined above, in response to needs of clientele. Not every media specialist would fill all needs of all people, but the media service profession in its totality would commit itself to such coverage insofar as possible. This paper assumes the necessity of separating the role of the media specialist from that of administrator and manager of the media institution on its various levels. It maintains that failure to separate these roles constitutes a major problem in providing user services. The media specialist role set forth here constitutes a distinct contribution in preparation for which a doctoral degree would be necessary, as well as a master's degree in a subject area appropriate to the specialist's clientele service. The actual use of the preparation in rendering service would be constantly monitored. A suggested doctoral program is outlined below in the section, Program Design for Educating Media Specialists.

Two concepts in particular distinguish the perspective of media service unfolded below: (1) the employment base; and (2) the advocacy role.

The employment base of the media specialist, if he is not engaged in private individual or group practice, would be one or more of any number of organizations, institutions, etc., of a private or government nature. Specific examples would be an adult education center, a school district, a city government, a clearinghouse or information analysis center, an academic department, a university research center or institute, a consultant firm, or a media institution with one or more media specialists in residence. Media specialists would be affiliated with media institutions that grant them this privilege, as medical doctors are affiliated with hospitals. Comparisons with the medical profession, however, easily become artificial and strained. They are used here only on a very general basis and cannot be applied in a blanket fashion to details.

Media institutions would be staffed as hospitals are, with an administrative staff, various levels of supportive personnel, and paraprofessionals. The full potential value of the technical assistant and especially the library assistant in media institutions should not be underestimated. The latter could also ably head various units and service departments. The present librarian position would be largely handled by the upper levels of supportive staff and partly by the media specialist. Those on the administrative staff would have received educational preparation especially suited to this purpose through a revision in thrust of the present master's degree in librarianship.

If it is considered that there is little value in contemplating a change as major as this, this would attest to the need for the media specialist's role. As will be unfolded below, the media

specialist would be responsible for designing services according to rationale free from any limitations built into his thinking as a premise, such as state certification regulations. In his advocacy role, the description of which follows immediately below, he would instead attempt to engineer change necessary toward enhancing service to clientele. For example, the idealized SCATT System for science, with potential for use in the social science and humanities fields as well, proposes the provision by publishers of reproducible master copies with appropriate charges for use ("Third Version of an Idealized Design of a Scientific Communication and Technology Transfer System," prepared by The Busch Center, The Wharton School, University of Pennsylvania, for the Office of Scientific Information Service, National Science Foundation, Working Paper, 10/1/74, Russell L. Ackoff and James C. Emery, Principal Investigators). The media specialist would work in collaboration with publishers toward this end. In generating and producing services, however, it would be his responsibility to see that the cost (in terms of time, people, and material resources) of obtaining, understanding, and using the information is not beyond the capacity of the system (Argyris, Chris, Intervention Theory and Method; A Behavioral Science View, Reading, Mass.: Addison Wesley, 1970, p. 37).

The advocacy role of the media specialist relates to his active intervention on behalf of clients in areas directly and indirectly bearing on providing them with media services. The role, thus defined, contributes toward moving subject fields forward in necessary ways not now systematically filled. These deal with revealing the structure of a field, perceiving possible new directions

in building theory, in designing methodology, and in discovering gaps in knowledge about the field, in short, with a direct grappling with the field's paradigm (sum total of factors contributing to its identity) and the possible replacement by a new one. The interventionist activity of the media specialist would take the form of engineering the advancement of service through such societal forces as professional associations, commercial firms, government agencies, publishers, producers, and in collaboration with individuals and groups comprising the clientele. A high degree of autonomy would be accorded the media specialist by his employment base, but a substantial degree of interdependency and interaction would characterize his relationship with clientele in the continuous process of diagnosing or creating need, and of generating, testing, and implementing services. The newer concept in the school media service field of the "technician," in spite of its connotation of a middle level personnel rank, designates the specialist who works directly with teachers in creating educational goals, in providing media, in arranging for their creation, and in evaluating use of media. It bears similarity to the role of media specialist as defined here (Heinich, Robert, Technology and the Management of Instruction, Washington, D. C.: Association for Educational Communications and Technology, 1970).

The concept of "advocacy" presented here is different from the currently accepted definition. The latter carries the idea of an intermediary role on behalf of the client with an agency in his personal needs, such as following through to see that an elderly person actually receives full Medicare benefits after he has come

to inquire where to obtain payment. The reason for the apparent limitation in the concept of advocacy embodied in this paper is that media service must consist of a fairly discrete professional paradigm in order for media specialists to cope with a manageable function and to describe the particular kinds of problems to which the field addresses itself with the types of solutions it generates according to the conceptual basis of its research procedures. The paradigm may change in time, but a sharper awareness of the field's operational paradigm might well heighten sensitivity to its limitations, an awareness fundamental to change. "Advocacy," as defined here, does include, however, referral service for interpretation of content and follow-up assistance on the user's behalf, where necessary or desirable. It also includes the exploration of legal aspects of responsibility for accuracy of information, both for that provided by the specialist, and for that provided by the specialist in response to requests for verification of information obtained from other sources.

General Systems Science

The following definitions are paraphrased or taken in entirety from the brochure describing the interdisciplinary graduate Systems Science Program at the University of Louisville. (The word "general" is inserted before "systems" to avoid confusion with "systems analysis" in the more limited sense as it applies primarily to the technical functions of libraries, as well as with "systems" as limited to cooperative library arrangements. General systems science concerns the structures, functions, and behaviors

of systems, together with the application of this knowledge to the design, evaluation, explanation, and management of systems. It may be divided into three major parts: (1) general systems theory, defined as a mathematically based set of theories which describe the structure and behavior of systems, an approach which seeks to determine the connections among different theories, (2) general systems methodology, consisting of pure and applied mathematical systems theory, tools for systems analysis, techniques of simulation and model building, and others, (3) general systems applications, referring to the application of systems thinking and methodology to problems in a given field (education, etc.) or to certain types of man-made systems (human factors engineering, etc.).

PROBLEM STATEMENT: A CONCEPTUAL DIRECTION FOR MEDIA SERVICE

Librarianship and information science as currently viewed are variously defined in the literature as to their component fields, the related fields from which they draw, and areas of application. A unified, rationalized conceptual direction for media service, however, does not appear to have emerged. Particularly nebulous is the librarianship-information science relationship, compounded by the assignment of responsibility to the same individuals for both provision of media services and the administration of the base department or institution from which they are provided. The following sampling of such fields illustrates the problem. The relationship among them is apparent. It implicitly

poses the question of the place of these fields in a unified conceptual direction for media service.

Information Theory and Information Science

Robert Ash explains Shannon's mathematical uncertainty measure in his Information Theory (New York: Interscience Publishers, 1967). Susan Artandi examines the concept of information within the framework of the mathematical theory of communication and semiotics to understand the concept as dealt with in the context of information systems ("Information Concepts and Their Utility," Journal of the American Society for Information Science, 1973, 24, 242-245). Glynn Harmon, in his Human Memory and Knowledge: A Systems Approach (Westport, Conn.: Greenwood Press, 1973, p. 97), notes that information sicence components, such as principles of economy and simplicity, resemble the isomorphisms of general systems theory. Treatment of the relation of information science to linguistics, syntactics, and semantics may also be found in the literature.

Cybernetics

Sylvia Dost ("The Cybernetic Past--And Questions for the Future," American Society for Cybernetics Forum, 1974, 6, p. 3) defines cybernetics as the science of control and communication in the animal and machine. She goes on to raise social and global questions similar to those which concern the Society for General Systems Research, as evidenced by the theme of the Society's 1975 annual meeting, Systems Thinking and the Quality of Life. In the same issue of the Forum (p. 5), American University describes its

course, Introduction to Cybernetics, part of the required curriculum for Graduate Level Programs at the Center for Technology and Administration, as covering organization, system stability and pattern recognition, command and control, network analysis, information storage and retrieval, and the use of cybernetics in management.

Philosophy

Frederick J. Crosson and Kenneth M. Sayre, editors of Philosophy and Cybernetics (New York: Simon and Schuster, 1967), present chapters which show relationship between these two subjects. Herbert Spencer, in his Reasons for Dissenting from the Philosophy of M. Comte; and Other Essays (Berkeley, Cal.: Glendessary Press, 1968), speaks implicitly in terms of systems when he discusses society as an entity.

Epistemo-Dynamics

Manfred Kochen, in his Integrative Mechanisms in Literature Growth (Westport, Conn.: Greenwood Press, 1974), sees a new scientific discipline emerging: epistemo-dynamics. It is concerned with lawful regularities governing the acquisition of information and its transformation into knowledge, the assimilation of knowledge into understanding, and the fusion of understanding and wisdom. According to Kochen, this discipline could become the core of the information sciences (p. 38).

Dissemination and Utilization of Knowledge

Planning for Innovation through Dissemination and Utilization of Knowledge, cited above, is a contribution to theory in this area

resulting from a literature search of over 4,000 entries. Ronald G. Havelock is the chief investigator of the study. The D&U macro-system is viewed as a transfer of messages by various media between resource systems and users. Covered in the work are an analysis of characteristics of individuals and organizations which inhibit or facilitate this transfer; and interpretation of the process at four levels--the individual, the interpersonal, the organization, and the social system; specialized linking roles between resource and user; phase models of the total D&U process; and factors concerning types of messages and types of media. A systems science approach is evident in the models developed. These will be referred to below.

Communication and Behavioral Science

Jurgen Ruesch states in his Disturbed Communication; The Clinical Assessment of Normal and Pathological Communicative Behavior (New York: Norton, 1957, p. 173) that in communication theory, the assumption is made that information controls behavior. By studying information and its exchange, one can obtain a better understanding of human behavior. According to Kenneth M. Sayre (Recognition: A Study in the Philosophy of Artificial Intelligence, Notre Dame, Ind.: University of Notre Dame Press, 1965, p. 225), an increasing number of applications for information theory have been found among the behavioral sciences. A generalization of Shannon's work, the theory of bidirectional communication, is presented by H. Marko ("Information Theory and Cybernetics," IEEE Spectrum, 1967, 4, 75-83) for a better understanding of the communication processes in man.

Systems Analysis

Systems analysis, formerly referred to as scientific management, includes computer science applications. Richard E. Nance ("An Analytical Model of a Library Network," Journal of the American Society for Information Science, 1970, 21, 58-66) explores a model that could be used in specific cases to evaluate, among other things, alternative structures of library networking, in this case, the centralized and decentralized.

GENERAL SYSTEMS SCIENCE

General systems science, it is hypothesized here, constitutes the most appropriate foundation for revealing components and related areas of the media service field and for evolving sound formulation of operational paradigms. Because of its centrality to this paper, it is appropriate at this point to characterize briefly the field of general systems science. The publications of the Society for General Systems Research, organized in 1954, include the General Systems Yearbook, published annually since December 1956; the bimonthly journal, Behavioral Science (published since 1956 but since January 1973 as a journal of this Society); and the General Systems Bulletin, which took on a revised format with the autumn 1974 issue. O. R. Young ("A Survey of General Systems Theory," General Systems Yearbook, 1964, 9, 61-80) reviews work done in the field of general systems theory to find common ground and divergences and pins down the dimensions of the field covered by general systems theory. Following are other selected references that trace development in the field from early concepts, through modification in the formulation

of theory, including effort to evaluate the field for soundness, to more recent stances.

Ludwig von Bertalanffy ("General System Theory," General Systems Yearbook, 1956, 1, 1-10) postulates a new discipline which he calls general system theory, the subject matter of which is the formulation and derivation of those principles which are valid for systems in general. Kenneth Boulding ("General Systems Theory--The Skeleton of Science," General Systems Yearbook, 1956, 1, 11-17) proposes an approach to general systems theory through an arrangement of theoretical systems and constructs in a hierarchy based on complexity.

Russell L. Ackoff ("General System Theory and Systems Research: Contrasting Conceptions of Systems Science," General Systems Yearbook, 1963, 8, 117-121) disagrees with Boulding that the newer interdisciplines derive from the reorganization of material from many different fields of study. Ackoff states (p. 117) that in operations research, the subject matter of research is not disorganized into disciplinary material in the first place. There seems to be a confusion here, however, between disciplines utilized by certain fields which form their components and disciplines which are applications of those fields. Ackoff (p. 118) argues instead for building up theory relevant to system phenomena taken holistically without regard to disciplinary divisions. The question arises as to how to reach the holistic without considering the disciplinary divisions individually.

Ackoff (p. 117) prefers, with reference to an assertion of Boulding in particular and to general systems theory in general,

that science be conceived of as an activity rather than as a body of facts, laws, and theories. General systems science is viewed here as necessarily both, for no logical constraint exists to force the definition to an "either-or" basis. Present day systems science projects, as exemplified by the University of Louisville graduate Systems Science Program, mentioned above, apparently share the strength reported by Ackoff with respect to operations research projects that they generally produce both theoretical and empirical knowledge of systems. A pamphlet describing the Louisville program states (p. 3): "The underpinnings of the education program is general systems theory; this is not to be a vacuous study of GST but a pragmatic one. Applications are required in all courses."

A. D. Hall and R. E. Fagen ("Definition of System" General Systems Yearbook, 1956, 1, 18-28) define types of systems and their characteristics. V. A. Lektorsky and V. N. Sadovsky ("On Principles of System Research," General Systems Yearbook, 1960, 5, 171-179) find incomplete, however, the classification of systems proposed by Bertalanffy, as well as that enumerated in the Hall and Fagen article. According to Lektorsky and Sadovsky (p. 175), these authors fail to consider the peculiarities of self-developing systems. Also, they do not present a theoretical investigation of relations among systems, as well as of conditions under which a system is modified in its form. This broader approach, they claim, would allow an ordering of systems in a sequence according to complexity, which proposal seems similar to that put forth in the Boulding article, cited above. W. Ross Ashby ("General Systems Theory as a New Discipline," General Systems Yearbook, 1958, 3, 1-6) recommends considering the set of all conceivable systems, whether or not they actually exist in the real world, and then reducing the set to a more reasonable state.

Karl E. Weick ("Middle Range Theories of Social Systems," Behavioral Science, 1974, 19, 357-367) argues that awareness of biases favoring false positives in support of general systems theory should result in interdependence being treated as a variable rather than a constant, and in specification of conditions under which systems theory does and does not apply. There seems to be a failure in the article, however, to distinguish between recursive features of organizational processes and the human system that determines coordination by plan rather than by feedback at a certain point. It is also necessary to identify what patterns of communicational interrelationships nonetheless result in coordination when coordination is unintentional.

MEDIA SERVICE FOR THE NON-RESEARCHER

Criticism of the much discussed National Commission on Libraries and Information Science (NCLIS) initial draft report centers on the need for greater evidence of commitment to serve the very large, varied segment of the population of non-researchers, as well as the research community, in the proposed new national program of library and information services. This concern for non-researchers is related to a broader concern for all citizens reflected in such national efforts as the National Endowment for the Humanities and the National Science Foundation jointly sponsored program, Ethical and Human Value Implications of Science and Technology. Research grants, perhaps ironically in the face of concern with overemphasis on media service to researchers, are provided as a means toward carrying out the program's objectives.

The three models within the macrosystem of knowledge transfer outlined in the Havelock volume, cited above, are useful toward setting priorities for service to include both non-researchers and researchers. A general systems science approach also takes into account "value" aspects, so well expressed in Louis A. Lerner's choice of questions ("Where Do I Plug In?" Bulletin of the American Society for Information Science, 1974, 1, p. 12): "Is it more important for the medical researcher to know a reference to a rare disease from a search of the literature or for a Latino to know how to get his Social Security check to his wife in San Juan? Is it more important for a banker to know the rate of exchange in Bonn than it is for a black in an inner-city project to know where to get health services?" The same media specialist may not face this emotionally-charged either-or dichotomy at the same moment in the same media institution, but the media service profession would need to determine on what basis, and according to whose values, priorities in overall service planning would be set. He would serve a linking role, described in the Havelock volume (unnumbered Summary page) in a series of two-way interaction processes which connect user systems through media with various resource systems, including basic and applied research, development, and practice. Linkage would synthesize into a macrosystem, through intervention at appropriate points, the three following models of orientation toward D&U processes, paraphased from Havelock (p. 10-29): (It should be kept in mind that although this volume concentrates on the spread of new knowledge, the media specialist would be concerned with maintenance knowledge as well.)

(1) The Social Interaction Perspective describes cases where an innovation, usually in the form of a product or practice, is presented or brought to the attention of a potential receiver (user) population. The receiver and the receiver's needs are defined and determined exclusively by the sender. The diffusion of the innovation (or of any knowledge new to the recipient) depends greatly upon the channels of communication within the receiver group, for information is transmitted primarily through the social interaction of group members, including such factors as the existence of opinion leaders.

(2) The Research, Development, and Diffusion Perspective looks at the process of change from the point of view of the originator of an innovation. It begins with the formulation of a problem on the basis of a presumed receiver need. Although the initiative is taken by the developers, this perspective differs from the Social Interaction Perspective in that it views the process of change from an earlier point in time. Focus is on the activity phases of the developer as he designs and generates a potential solution. Dissemination and promotion of adoption behavior in the receiver group follow.

(3) The Problem-Solver Perspective finds the receiver actively involved in identifying an innovation to solve his own problem. He undertakes solution either through his own efforts, or by recruiting suitable outside assistance.

Russell L. Ackoff, in the article cited above (p. 121), expresses his hope that the unification of civilization might follow from the effort to find general principles that apply to both

conceptual and concrete systems. In serving to close the gap between science and the arts and humanities, general systems science might do more than unify science. It may be able to help unify culture. Anatol Rapoport ("Remarks on General Systems Theory," General Systems Yearbook, 1963, 8, p. 123), with reference to Ackoff's remarks, cautions that no approach and no program devised by mortals will succeed in unifying science any more than any social or economic arrangements will unify mankind. Rather, certain methodologies contribute more to integrating knowledge than others. In his "Preface" to the 1974 General Systems Yearbook (19, p. viii), he comments that it appears that the system-theoretic view is becoming a source of important insights contributing to the reunification of the two cultures.

Interaction with all concerned individuals and groups in setting media service priorities presumes a high degree of competence in interpersonal relations along with technical competence. A general systems science basis for media service requires attention to total aspects of service. It would help to decrease movement toward institutional entropy and increase forces toward learning and healthful exchange if the media specialist were aware of any difference between what he says and does, that is, of any difference between the espoused theories and theories-in-use that govern his behavior (Argyris, Chris and Donald A. Schön, Theory in Practice: Increasing Professional Effectiveness, San Francisco: Jossey-Bass, 1974, p. 174).

Interpenetration of technical and interpersonal theories of action that comprise professional practice is highly essential in

serving the non-researcher. Technical theories relate to the substantive tasks of practice; interpersonal theories relate to interaction with clients and others. Inability to apply effective theories of action to the interpersonal zones of practice, according to two behavioral scientists, Argyris and Schön (p. 172), constrains the practitioner's development and use of effective technical theories. In the past, the problem staff member in media institutions has been the object of attention in this area. More recently, a more generalized concern with all aspects of interpersonal relations has been manifested through publications, association activities, and continuing education.

The Havelock volume, with its concern for incorporating the non-researcher into the D&U macrosystem, corroborates the need to interpenetrate technical with interpersonal theories of action (unnumbered Summary page): "The resource systems must appreciate the user's internal needs and problem solving patterns, and the user, in turn, must be able to appreciate the invention, solution, formulation and evaluation processes of the resource systems. This type of collaborative interaction will not only make solutions more relevant and effective but will build relationships of trust, mutual perceptions by user and resource persons that the other is truly concerned, will listen, and will be able to provide useful information. These trust relations over time can become channels for the rapid, effective, and efficient transfer of information."

Media specialists whose employment base is the research center attached to universities would have an ideal opportunity, where media service is concerned, to contribute toward linking the

university with society at large. Sam D. Sieber and Paul F. Lazarsfeld (Reforming the University: The Role of the Social Research Center, New York: Praeger, 1972) enlarge on the research agency's integrative capacity for community service, interdisciplinary collaboration, and the unification of teaching and research. The authors' thorough analysis of the social research center includes treatment of the problematical risk of institutional marginality for the center.

MEDIA SERVICE FOR THE PRACTITIONER IN BEHAVIORAL SCIENCE AREAS

Practitioners in behavioral science areas are defined here broadly as administrators, managers, decision makers, interventionists, etc., in all fields, including business, industry, and education, at all levels from nursery to higher education. This recipient group is set apart here for discrete treatment because of its intense need for valid and useful information in order to perform on a daily basis. In some cases, the media specialist might appropriately perform in an interventionist type role.

The Havelock volume (p. 6-35) attributes to Bennis the forecast that in the organization of the future, the leader will be replaced by specialists whose primary purpose is to facilitate knowledge flow from one subunit to another, as a coordinator or linking pin between various project groups. Chris Argyris, in his Intervention Theory and Method; A Behavioral Science View, cited above, corroborates (p. 47) the information priority in his list of criteria for system competence, the first of which is awareness

of relevant information, and the second of which is understanding of that information by the relevant parts of the system.

The third, manipulability of information, may seem to contribute to what John W. Gardner warns against in Self-Renewal; The Individual and the Innovative Society (New York: Harper & Row, 1971, paraphrased from p. 97-98): It is a characteristic of the information processing system that it systematically filters out certain kinds of data so that these never reach the men who depend on the system. The raw data have been sampled, screened, condensed, compiled, coded, expressed in statistical form, spun into generalizations and crystallized into recommendations. It filters out emotion, feeling, sentiment, mood, almost all of the irrational nuances of human situations, and those intuitive judgments just below the level of consciousness. We suffer the consequences when we run head on into situations that cannot be understood except in terms of those elements that have been filtered out. Argyris has taken this possible distortion of information into consideration, however. This is obvious in his statement (Intervention Theory and Method, cited above, p. 281) that studying a universe of discourse (he refers to organizations) whose very nature is composed of human values significantly effects the kind of role the interventionist (media specialist as interventionist, where this is the case) and the respondents take. The media specialist, as conceived here, would not administer, it will be recalled, the media institution, referred to by whatever particular name, in the organization or firm in question but would instead be affiliated with it to serve his clientele.

A major contribution of the media specialist, in collaboration with appropriate sources, would be the construction of a model of behavioral inquiry. This might well be patterned after the Havelock volume which organized the content of the literature search into the macrosystem including the three models of knowledge processing. Milton C. Marney and Nicholas M. Smith ("The Domain of Adaptive Systems: A rudimentary Taxonomy," General Systems Yearbook 1964, 9, p. 107) define what behavioral inquiry addresses itself to as dynamic interaction coupled with the notion of modifiable characteristic response via internal system controls, in other words, behavior in response to stimulus coupled with behavior determined by such factors as temperament, heredity, or environment. A model of behavioral inquiry would seem to be the one most needed tool for designing information systems that take into account the interpenetration of technical and interpersonal theories in working with clients. Although the Havelock volume comes close to uniting the intrapersonal, the interpersonal, the conditions of communication, and the message itself, a model of communication theory is needed, beyond the Marney and Smith model. It would interrelate the following in a meaningful, cohesive fashion: the individual's information processing system, his voluntary or involuntary self-regulated ongoing responses, his self-concept, his attitude nd the functions they serve him for encoding and decoding messages, his responses according to the recently popularized transactional analysis, his responses along the continuum of Chris Argyris' categories for observing behavior (Organization and Innovation, Homewood, Illinois: Richard D. Irwin and Dorsey Press, 1970), communicational

misperceptions (Laing, R. D., H. Phillipson, and A. R. Lee, Interpersonal Perception; A Theory and a Method of Research, New York: Springer, 1966), and relationship aspects of communication, both "healthy" and pathological (Watzlawick, Paul, Janet Helmick Beavin, and Don D. Jackson, Pragmatics of Human Communication; A Study of Interactional Patterns, Pathologies, and Paradoxes, New York: Norton, 1967).

Another important contribution of the media specialist would be the creation of a number of information systems similar to the issue based type created by Hans Dehlinger and Jean-Pierre Protzen ("Some Considerations for the Design of Issue Based Information Systems," DMG-DRS Journal, 1972, 6, 38-45). These designers contend that all the questions a planner may ask belong to one of four categories of issues: deontic, factual, explanatory, and instrumental. This type of system stresses concepts and association of ideas. In addition to collecting, storing, and retrieving information thought to be pertinent to a meaningful debate about the issues, it could accommodate coding as to the logical elements of the statements according to the formal principles governing correct or reliable inference.

MEDIA SERVICE FOR THE RESEARCHER

As the media specialist engineered access to world knowledge and information through locating it or attempting to cause it to be created, he would work in partnership with researchers as he contributes actively toward building subject matter theory and structure through his media service activities. It will be seen

that every aspect of the advocacy role of the media specialist in serving researchers corroborates the necessity for the interpenetration of technical and interpersonal theories of action.

Organization of Media

Approximately twenty years have gone by since Boulding noted, in his article cited above (p. 16), that the theory of indexing and cataloging is only in its infancy, and that the cataloging of events, ideas, theories, statistics, and empirical data has hardly begun. Considering also the multiplication of records, he goes on to state that the need for more adequate cataloging and reference systems is perhaps the major unsolved theoretical problem at (what he refers to as) the level of the static structure. Whether or not the major unsolved problem, cataloging and reference systems remain a challenge today. The area of text processing systems is one that holds much promise. Both pure and applied research are needed on the nature and analysis of literary and nonfiction text.

The general systems science approach inherent in the Havelock volume would direct greater attention to testing the effectiveness of media organization schemes in a holistic fashion engaging total D&U macrosystem components. This approach would go beyond the traditional forms of catalog use studies centering on user practice. The first chapter describing the literature search on which the Havelock volume is based warrants thorough study for implications. One implication is that media institutions, through the source which provides their cataloging, could continue to organize their holdings to provide a location device, but that media specialists would

generate and test schemes of organization of media for particular purposes, utilizing each media institution's finding device only for locating media in that particular institution. Another implication has to do with the need for monitoring effectiveness of organizational schemes through evaluative feedback. This is not usually attempted by media institutions. The media specialist, on the contrary, would develop schemes in collaboration with users and test them through systematic feedback. The statement heard so often in my experience on the part of practicing librarians, faculty, and students, "Librarianship is not a research profession," precludes commitment to the formal, systematic testing of such assumptions. The general systems science approach, inherent in the Argyris-Schön concept of theory of practice, however, incorporates double-loop learning, or testing, along with diagnosis and implementation, as an integral aspect of the media specialist's theory of practice.

Interpretative State-of-the-Art Reports

Increasing numbers of interpretative state-of-the-art reports are needed as additional and vital means of controlling media. The authors responsible for the literature search comprising the Havelock volume note their discovery (p. 1-7) that the subject-matter headings of the typical index could not be used with any degree of efficiency. For the broad interdisciplinary topic of knowledge dissemination-utilization, the specific categories of the traditional index were seen to be inadequate. The librarian might feel that a researcher cannot expect standard practices to provide for specific needs. This is precisely what has prompted formulation of the perspective

of media service presented in this paper. The media specialist's role would be that of attempting to provide or engineer provision of services to researchers in any way feasible. Referring to the D&U literature search, Havelock comments (p. 1-8): "It is strongly urged that projects of this type be funded and undertaken at the earliest opportunity. Only through such development activities can we hope to control the knowledge explosion and improve the integration of scientific knowledge."

Havelock and Huber (p. 9-6) suggest the development of flexible and appropriate reference works such as loose-leaf handbooks and manuals. These activities would be appropriate at the clearinghouse or research center employment bases of media specialists and would be applicable to any subject field. This suggestion for what amounts to increased production of interpretative state-of-the-art reports is similar to Kochen's recommendation, in his work cited above (p. 263), for review papers which explicate the mutual relevancy of the selections. Kochen comments that often this results in a considerable contribution to theory. As mentioned above, this is the case with the Havelock volume. Through the media specialist's preparation, or through his engineering the preparation of interpretative state-of-the-art reports, he would play a definite, inevitable, and appropriate role in moving a subject field forward, as well as moving his own primary field of media service forward.

Boulding, cited above, comments (p. 16) with reference to his recommendation for establishing a hierarchy of systems that one advantage is that it would give some idea of structural gaps in both theoretical and empirical knowledge. It might be added that

inadequate concepts underlying research procedures would also be revealed, and a historical development of the field according to its succession of paradigms would result. Interpretative reviews of literary criticism, for example, would reveal a schema of theory on which criticism is based, along with identification of conclusions that lack a theoretical base determining choice of supportive evidence. John McLeod ("Behavioral Science, System Theory - and Simulation," Behavioral Science, 1974, 19, p. 67) presents an outline for uniform documentation of simulation studies. He realistically comments that it would be foolish to expect rigorous adherence by researchers to any such format. The media specialist, in his advocacy role on their behalf, would nevertheless profitably collaborate with them in laying groundwork for improving information sources.

Intradisciplinary and Interdisciplinary Communication

The media specialist would play an interventionist role in solving problems associated with furthering intradisciplinary and interdisciplinary communication. In Boulding's article, cited above, the following much-cited passage well characterizes this dilemma (p. 12): "The spread of specialized deafness means that someone who ought to know something that someone else knows isn't able to find it out for lack of generalized ears." The American Psychological Association Publication Manual (2d ed., 1974) expresses concern about the problem of terminology (p. 28): "Psychologists who communicate with only the dozen or so experts in their narrow specialties are not contributing significantly to the literature."

According to the perspective of this paper, the media specialist in his advocacy role would engineer understanding and/or rewordings of the literature in review papers so that the subject specialist can concentrate on answering the more important question relevant to his unique role: Is he contributing significantly to his field? The media specialist would enable subject specialists to enlarge their interdisciplinary understandings and vocabulary through media he selects for their in-service education. He would help work through dilemmas like the following that occur in interdisciplinary work: The social scientist may consider the thinking of a scholar whose definitions come from Webster's Third New International Dictionary as limited, whereas the literary scholar may regard as sloppy work the use of a behavioral science term in a piece of literary criticism that is not included in that particular source.

The Society for General Systems Research, noting that understanding of each other's domains by social and natural scientists is essential for the development of valid, cross-level systems study, incorporates ways of working in an interdisciplinary mode ("Managing Director's Letter," May 15, 1974, Appendix E, p. 21): "As a result of our experience we recommend that various meetings next year spend time in reducing misunderstanding, antagonisms, ambiguities, and so forth among all the sciences involved in general systems theory. It would be useful to start simply and build slowly in order to get a common base of understandings." The pamphlet (p. 3) explaining the Systems Science Program at the University of Louisville states that interdisciplinary study proposals are required

to be cast into the common dialogue for discussion by the Fellowship (acknowledged scholars from across the University interested in interdisciplinary research).

Intellectual Freedom

Media specialists can serve researchers in the area of intellectual freedom by taking a more active part in the D&U process as set forth in the Havelock volume. Setting priorities in service to non-researchers and researchers has an intellectual freedom aspect. The feedback inherent in the knowledge D&U macrosystem would encourage genuinely useful research and interpret seemingly useless pure research without undue restraint of activity and expression. In this regard, Anatol Rapoport, in his article, "Remarks on General Systems Theory," cited above (p. 124), states that he does not believe the problem of research topics has so much to do with the distinction between concrete "real life" problems and abstract problems of conceptualization as it has with whether the investigator has a problem at all.

L. N. Landa (Algorithmization in Learning and Instruction, Englewood Cliffs, N.J.: Educational Technology Publications, 1974, p. xix) exemplifies another problematic aspect of intellectual freedom in his statement that at the end of the 1950s, any attempt to apply the ideas and methods of cybernetics to pedagogy encountered sharp protests. The media specialist's advocacy role would enable him to provide an appropriate clearinghouse as an outlet for documents that fail to gain immediate colleague acceptance crucial or helpful toward publication. On the other hand, the researcher must not be

permitted, insofar as possible, to shield others from data that do not support his thesis.

If the interventionist role of the media specialist in mediating within groups of researchers, and between researchers and non-researchers, would seem difficult, mediation with the researcher on an individual basis would offer a still greater challenge. Chris Argyris, in his Behind the Front Page (San Francisco: Jossey-Bass, 1974, p. 280), states: "I predict that even compulsive censorship within the Pentagon is mild compared to the censoring that human beings perform every day of their lives." Scholars who react negatively upon receiving media in response to their requested literature search containing ideas opposed to those embodied in their current research; those authors of reviews or of letters in discussion columns in literary journals, for example, and those respondents who manifest greater underlying preoccupation with "relationship" rather than "content" aspects of the exchanges; the several scholars at a conference on religion and literature who emotionally charged a speaker for attacking the stature of the critic and the field of literature, whereas the speaker had simply stated that because of the impact of religion on literature, the critic needs to take religion into account -- these inflict censorship upon themselves.

But the media specialist has his own biases to grapple with in compiling interpretative state-of-the-art reports. These are exemplified by the ERIC interpretative summaries, as well as those that perhaps in the future will be produced by the MLA Abstracts system and the American Psychological Association Journal Supplement

Abstract Service (JSAS). The proposed SCATT system, cited above, is reminiscent of the Havelock volume. It calls for annual reviews intended for those in the same field and reviews of other fields from which the fields in question could benefit. It also provides for reviews across levels of basic research whose output is useful primarily to other researchers, applied research whose output interests primarily those other than researchers, and development that reports creation of new products or services. Obviously, these systems could develop undesirable features of control. To exactly what extent attitudinal and interpersonal factors operate against the knowledge and information transfer process requires further study. The interdependence of the media specialist and the researcher demanded by the former's advocacy role requires a general systems science approach to all the parameters of service to ascertain areas requiring cross-checks.

PROGRAM DESIGN FOR EDUCATING MEDIA SPECIALISTS

An educational program for media specialists, as provisionally envisaged, follows. It draws on the University of Louisville Systems Science Program in describing the general systems science basis. In its totality, it differs from the Stanford and Syracuse doctoral programs in information transfer although certain similarities appear to exist. Phraseology from Argyris and Schön was used in formulating the specific curricular objectives.

General Program Objectives

General program objectives would be to develop the media service field through research and to prepare specialists for the media service profession. Specific curricular objectives would be to equip students to integrate theory with practice, to integrate affective with technical learning, and to interpenetrate technical and interpersonal theories of action that, when organized into a pattern, represent an effective theory of practice.

Curricular Content

There would be three major overlapping content areas: general systems theory, general systems methodology, and general systems applications. Methods of designing learning environments for presenting the curriculum are not treated here. However, these would utilize a general systems science approach and would not necessarily involve courses as traditionally structured. The Argyris and Schön volume, implicitly an algorithmic type of approach to effective behavior, plots an exemplary methodology for acquiring an interpenetration of technical with interpersonal theory. Prerequisite undergraduate preparation, not outlined here, would be specified, including mathematics and computer science, to permit the graduate program to assume certain knowledge on the part of the student.

General Systems Theory

The general systems theory portion of the curriculum would consist of a general introduction to the field of general systems science and the theories on which the field is based. Included would be such topics as general systems theory, epistemology,

cross-level hypotheses, systems structures and processes, subsystems, relationships among subsystems or components, the living system level, automata, decision theory, and experimental approaches to systems research.

General Systems Methodology

The general systems methodology portion of the curriculum would include such topics as statistics, media, logic, computer assisted research and education, simulation modeling, information theory, cybernetics, probabalistic communication, management information and control systems, systems planning, and cost-effective analysis.

General Systems Applications

General systems applications in the field of media service would be made throughout the theory and methodology portions of the curriculum. A demonstration research activity, the equivalent of the doctoral dissertation, would be guided by an interdisciplinary committee chaired by a professor specializing in media service.

Interpersonal Theories

Interpenetration of technical and interpersonal theory in the curriculum deserves enlargement here. The following consideration may serve to establish the importance of developing the media specialist's personal qualities. The Double Helix: A Personal Account of the Discovery of the Structure of DNA (New York: Atheneum, 1972), reveals James D. Watson as equally outstanding in personal qualities of perseverance as in intellectual ability. One wonders

whether the structure of DNA, given the circumstances Watson faced, would have been discovered by anyone else just as intellectually gifted but less adept at resisting discouragement and dealing with what seemed to be a fairly steady encounter with closed-mindedness or personality problems with colleagues. Donald C. Gause and Gerald M. Weinberg ("On General Systems Education," General Systems Yearbook, 1973, 18, p. 139) remark in seriousness, phrased somewhat playfully, that even disciplinarians and interdisciplinarians are people part of the time and that general systems education might have some effect on their people-component as well as their specialist-component. This view underlies the perspective of a media specialist's educational preparation advocated here.

The media specialist would build a theory of practice on what Argyris and Schön, in their Theory In Practice; Increasing Professional Effectiveness, cited above, describe as model II behavior, which is conducive to continual learning and effectiveness through accepting personal causality. When a practitioner's theory-in-use, rather than his espoused theory, is governed by the following variables, he behaves according to model II (p. 87): valid information (by this the authors mean that assumptions about others have been based on directly observable data and have been publicly tested with the individuals involved), free and informed choice, and internal commitment to the choice with constant monitoring of its implementation. By contrast, the governing variables for model I behavior (p. 68-69) are: define goals and try to achieve them, maximize winning and minimize losing, minimize generating or expressing negative feelings, and be rational. This behavior, the authors note, tends to result

in professional behavior characterized as competitive, diplomatic, and anti-emotional. An appraisal service experience like that offered by the BFS Psychological Associates, Inc., New York City, would beneficially be incorporated into the curriculum at an appropriate point.

The relevance of behavioral models to media service is especially seen in what would possibly be the most problematical area of the specialist's work: establishing and maintaining effective relationships with media service institutions. To pursue the institutional analogy with the hospital, anyone who has ever been present to hear a surgeon repeatedly request a dressing for a post-operative patient for nearly an hour until it arrived from the supply room, or to observe someone informing the main desk that no one is to be found in the emergency room or anywhere near it, understands what is probably behind the newspaper report that doctors dismissed the local hospital administrator. Libraries could supply similar incidents which indicate need for increased in-service training. Should academic libraries be among those institutions or agencies serving as local SCATT (or similar) Centers, care would have to be taken to assure that local academic service or attitudinal limitations did not conflict with and affect fulfillment of Center service commitments.

It should be clarified that the behavior associated with that of librarian activists, or those attempting social reform, does not necessarily demonstrate model II behavior. Argyris and Schön point out (p. 81) that the applicability of model I does not seem to be restricted by age, professional status, race, income level,

or field of activity, that it is as ubiquitous among hard-headed businessmen as among militant revolutionaries, among blacks as among whites, among the discontented young as among the middle-aged. Behind the Front Page by Argyris, cited above, presents insights into the operations of the press that might be studied for their possible applicability to libraries, for example (p. 237): "An investigation of the internal workings of the press might reveal that newspapers are managed by a system whose characteristics are the very ones they so often denounce;" or (p. 252) "The rhetoric about management used by Reporter-Activists may stress egalitarianism and cooperation; but the way they behaved was authoritarian, individualistic, and competitive."

Evaluation

Evalution of the total program for educating media specialists stands much to benefit from application of the general systems science approach. Research conducted by Charles N. Shooster ("Tests and Prediction: A Systems Analysis Approach," Behavioral Science, 1974, 19, 111-118) concludes that it is just as reasonable to make predictive statements from the system as from the person. The contribution of system variance influencing person performance requires equal measurement emphasis. Diagnosis, improvement and testing would then be pursued. The Society for General Systems Research Computer Augmented Research Environment (CARE) for Comparing General System Theories and International System Education Programs (General Systems Bulletin, 1974, 5, p. 6, 19) might profitably be adapted by

media specialists for similar uses toward overall evaluation of media service preparation.

A general systems science approach to faculty evaluation would help face up to and deal with the dilemma of peer rating in instances like that cited above concerning Landa in his early attempts to apply cybernetics to pedagogy. Richard I. Miller (Evaluating Faculty Performance, San Francisco: Jossey-Bass, 1972, p. 6) states that the recognition accorded university professors has been based upon how well their activities are received by colleagues and students. A general systems science concept of faculty evaluation would incorporate an attempt to devise specific ways to consider possible applicability of the factor that at times worthy research has for a period of years been rejected by colleagues, later to become established as acceptable and sometimes classic. With respect to evaluating faculty and student performance, Fred E. Katz ("Indeterminacy in the Structure of Systems," Behavioral Science, 1974, 19, 398) suggests the development of theorems about the optimal balance between indeterminacy in interactant roles. This development would profitably be pursued. Professor X's This Beats Working for a Living; The Dark Secrets of a College Professor (New Rochelle, New York: Arlington House, 1973), although regrettably tinged with an aura of sensationalism, enumerates various factors, painfully familiar to my experience at least, that cry out for a general systems science approach to academic management.

CONCLUDING COMMENT

Society, viewing the media specialist as interventionist in an advocacy role, according to a perspective of service rooted in general systems science, would not need to ponder whether media service is a profession. The affirmative answer would be self-evident.

NOTE: This paper benefited from the criticism of David Calloway, Michael Moulds, and Terry Ratliff.