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A Descriptive Analysis of Instructional Design Programs

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A DESCRIPTIVE ANALYSIS OF INSTRUCTIONAL DESIGN PROGRAMS IN SELECTED INSTITUTIONS OF HIGHER EDUCATION

by

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CHAPTER I

INTRODUCTION

Institutions of higher education are currently faced with challenging student unrest, increasing enrollments, generating technological advancements, advancing systems approach applications, expanding knowledge, and limiting financial resources. In consideration of this rationale list, large colleges and universities are increasingly reflecting an interest in planning and implementing programs which seek to emphasize academic priorities and improve the overall quality of instruction. As this movement commences, questions are being asked about the most effective and economical means of program implementation. Concerns range from faculty time, talent priorities, utilization of instructional space and facilities, independent study strategy effectiveness, available instructional design expertise to the implementation of instructional resources now available or soon to be produced for higher education.

Study Rationale

At the National Conference for Curricular and Instructional Innovation for Large Colleges and Universities, Paul A. Miller observes:

> Innovation as a university posture is mere discussion unless it ferments continuously within the faculty. Any discussion about change in university life usually ends on the question of how best to make contact with the faculty. And, unfortunately, we usually do no more than

> raise the question after going through a tortuous process to get to it. We remain quite unsure about the university as a phenomenon of structure. The university tradition is sacred--whether one lives in or out of it. We steadfastly refuse to use tools of analysis which are now commonplace in other settings.
>
> We want to be orderly and rational about resource allocation, about faculty rewards, and about the evaluation results. However, we have inherited an ancient belief that, while the university as a whole must resolutely organize for its own protection, internal chaos somehow spawns strength. We seem to feel that haphazard activity safeguards competing points of view and that to organize learning is in the end to destroy it. We deny that the tenets of bureaucracy or the captains of erudition have any standing in the community of scholars, yet our universities provide an example of rigid compartmentalization. The first principle of diffusing innovation throughout the university is to become more forthright about what we say out of sacredness and what we do out of fact.[1]

In a 1968 research project, F. Craig Johnson hypothesizes that our colleges and universities have been under stress from increasing enrollments, expanding knowledge, rising student expectations, and limited resources to meet the demands of society. When this hypothesis was tested, six additional problems are considered to be more critical. These problems include: (1) the urban campus and providing non-academic space for the commuter student; (2) the growth of graduate education and its impact on the undergraduate program; (3) the need for faculty to define the curriculum in terms of a major university in our society; (4) academic planning and its relationship to university budgeting

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[1]Paul A. Miller, "Large College and University Instructional Innovation," A speech delivered at the National Conference for Curricular and Instructional Innovation (East Lasning: Michigan State University, November 10, 1966).

procedures; (5) the interaction of the university with the state legislature and state politics in general; and (6) the development of a unique character for the university as it maintains quality.[2]

In response to these pressures of major and emerging university problems, the faculties, administrators, and governing boards of higher education are establishing academic support agencies. The major rationale in this basic development is twofold: to place emphasis on the university academic priority and to extend a means for the improvement of instruction.

Definition of Terms

One type of academic support agency is currently being described as an instructional design program. These instructional support programs correlate the abilities of learning design, media resource, and evaluation specialists to provide major guidelines for course development and improvement.

The term "instructional design program" is defined by the National Education Association's Department of Audiovisual Instruction in collaboration with the American Association for Higher Education in their publication New Media and College Teaching:

> A systematic approach of the materials, equipment and other interrelated elements (including human components)

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[2]Craig F. Johnson, An Evaluation of Educational Development Programs in Higher Education, U.S. Office of Education Project No. 7-E-114, Grant No. OEG 0-8-070114-1856 (010) (East Lansing: Michigan State University, 1968), pp. 8-9.

> of an assemblage that operates in an organized manner in handling the appropriate encoding of instructional messages and the distribution, use and refinement of information. To be effective, such a system must be sensitive to various stimuli and include elements for appropriate response, feedback, and adjustment.[3]

In its simplest form, the process of an instructional design program for the entire curriculum of an institution of higher education involves the following eight procedural steps:

1. Develop clearly defined instructional objectives stated in operational, measurable terms.

2. Define efficient ways of carrying out these functions, giving specific regard to machines, materials, and human capabilities and to their interaction in a design.

3. Determine functions related to the achievement of these objectives that may be performed adequately (or the most effectively and economically) by: (1) *instruments alone* - (mechanical, electronic, tapes, and other); (2) *non-technical materials alone* - (books, programmed texts, syllabi, etc.); or (3) *human beings* - (persons, instruments, or materials).

4. Distinguish the "human" functions most likely to be performed effectively by: (1) one student working alone, as in a study carrel; (2) one or two students working with an instructor, as in a tutorial or dialogue; (3) small groups of students working with or without instructors; (4) instruction in medium-sized groups (20 to 60 members); (5) large group "in-person" instruction (up to several hundred persons taught simultaneously, for example in a large auditorium); or (6) instruction in "super-large" groups as in the case of televised course presentations that are distributed live to viewing groups in various parts of the campus.

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[3]James W. Brown and James W. Thornton, Jr., New Media and College Teaching (Washington, D.C.: The Department of Audiovisual Instruction and the American Association for Higher Education, 1968), p. 119.

5. Study the available professorial as well as non-professorial backup talent to discover persons with special capabilities and interest in performing the instruction tasks described.

6. Analyze the students to discover those who appear to be most capable of profiting from participation in the various alternative types of learning activities. (Some might prefer and be capable of handling independent study activities, for example, whereas others may flounder without more direct instructor guidance.)

7. Determine the requirements of the instructional design, by survey of technical and non-technical resources, physical facilities, support services, budgets and policies with a view toward improving or expanding them. The library, the media center, the listening laboratory, the independent study facility and other relative units are considered integral, nonsupplementary to a successful instructional design program.

8. Evaluate feedback data regularly, change and improve as called for with regard to originally stated objectives.[4]

In essence, the instructional design program concept involves an operational plan of integrating a combination of elements: learner, faculty, instructional materials, facilities and equipment, and specialized professional and classified staff personnel for design and development of instruction. This dynamic approach provides a means for producing, evaluating, and revising instructional activities to achieve specific, definable goals.

This technological approach involves stating behavioral objectives, planning the integration of assets of all kinds, presenting the message content, achieving feedback by tests and by informal means, and replanning--all basic for course planning and development.

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[4] Ibid., pp. 119-120.

Finally, this writer wishes to express the distinction between the terms "educational development" and "instructional design." "Educational development" is a set of scheduling and coordinating procedures, facilities, or personnel for the purpose of designing instructional systems. "Instructional design" is the activity representing the policies and procedures determined by the educational development system.

Basic Assumptions

C. Ray Carpenter has identified several propositions of fundamental importance to both the theory and practice of instruction in higher education. These propositions serve both as statements and questions to the descriptions of applications for technology of learning in the instructional design process.

Carpenter has developed four broad generalizations which are also related to the purposes of this study. Each of these generalizations generates a frame of reference within which the theme of learning technology evolution in higher education can be focused and the specific problems stated:

> 1. The whole educational task is to provide favorable learning conditions for persons who have the needs, rights, and abilities to learn. How can this be done?
>
> 2. The needs-demands aspects of higher education are unlimited, but educational operations are limited, bounded, and restricted. What are the conditions, including human factors, which set undue and nonadaptive limits and boundaries to educational services and activities, and how might these limits and boundaries be made more coextensive with the needs and demands for educational services?

3. The kinds and amounts of work of higher education, however defined, cannot be accomplished fully by traditional approaches, methods, and procedures. What are the means potentially available that make it possible to accomplish more nearly than at present the goals that are expected of colleges and universities?

4. There is in progress a true revolution in the sciences and technology of communication and information management, and many parts of the products are applicable in education. What parts of the technologies of this development are applicable to the tasks and requirements of education for which colleges and universities are generally responsible?[5]

The Problem

The purpose of this study is threefold: (1) to locate instructional design programs which have been developed in higher education; (2) to prepare a descriptive analysis of instructional design programs in selected institutions of higher education; and (3) to make recommendations for implementing an instructional design program.

Because instructional design programs are relatively new in higher education, information is necessarily limited. Descriptive information is a desirable source of feedback for determining the success of existing instructional design programs. For institutions that are currently contemplating the initiation and development of an instructional design program, the results of this study should serve as guidelines.

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[5]Ray C. Carpenter, "Instructional Functions of New Media," New Media and College Teaching, eds. James W. Brown and James W. Thornton (Washington, D.C.: The Department of Audiovisul Instruction and the Association for Higher Education, 1968), p. 5.

Significance of the Study

This study should provide descriptive data of the nature and scope of instructional design programs which are planned or implemented by institutions of higher education. Hopefully, it will indicate a trend of program purposes and priorities for higher education institutions which are contemplating or actively engaged in establishing a systematic approach for the improvement of instruction. Data from the study should also be of value for comparative purposes and provide additional feedback information for governing boards, administrative and other staff personnel of institutions which have established operational programs.

A need also exists at a number of institutions of higher education which have not implemented systematic instructional design programs. This study should suggest guidelines for a program within the structure of higher education. Recommendations offered in this study, hopefully, will stimulate initial program development as well as extend and improve those programs already implemented.

Procedures

Criteria were developed for the purpose of identifying institutions of higher education which have either an established instructional design program or are actively engaged in developing one. Publicly controlled universities with a resident student enrollment of not less than 16,000 were surveyed by written questionnaire. Opening

Fall Enrollments--Higher Education, 1968[6] supplied selection data for these universities' identification. (See Appendix A for list of criteria)

Questionnaire data have identified universities with an implemented or planned instructional improvement or development program with full instructional design provisions. Specifically, the nature and extent of learning design, media resources, and systematic evaluation services were surveyed. Many of the responding university chief academic officers or their subordinates also submitted copies of documents, memoranda to faculty, or press releases which further related their program's scope and purposes.

Visitations were made to selected institutions for the purpose of conducting personal interviews with persons involved with instructional design. These institutions were selected using the criteria of limited time and resources, completeness of their instructional design concept, and geographic distribution. With both time and resource limitations, approximately two days at each institution was required to visit faculty, students, and administrators involved with instructional design. (See Appendix B)

The following specific data were collected at each of the selected institutions which were visited:

1. The Program Title, Purposes and Priorities:

Two approaches were employed for determining how these selected

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[6] Opening Fall Enrollments--Higher Education, 1968 (Washington, D.C.: U.S. Government Printing Office, U.S. Office of Education, 1969).

universities perceive the purpose of their instructional design programs. First, a written statement of the program purpose was obtained from documents, memoranda to faculty, or public informational press releases. Second, each program director was requested to rank, in a priority manner, statements of program purpose. The following list of program purpose criteria was ranked by the representative directors:

To identify academic problems

To stimulate and conduct learning research

To improve instruction

To provide learning design services

To disseminate learning resources

To communicate progress in learning research experimentation and implementation[7]

The systematic extent of each surveyed university academic support program was determined from responses on a written questionnaire. Chief academic officers or their associates ranked the range and extent of the instructional design elements of their academic support programs. The following criteria were utilized:

To technically encode curricula goals and objectives

To define and plan efficient instructional strategies (i.e., independent, interaction, and presentation)

To study and recommend available professional staff and clerical talent support with special capabilities in performing planned instructional tasks

To provide media reference services

To design and develop media resources

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[7]Johnson, op. cit., p. 12.

To provide media equipment services

To evaluate, systematically, all aspects of the program

To survey the institution's total instructional resources, facilities, services, and budgets for improvement or expansion purposes[8]

2. Administrative Structure of the Program with Relationship to the University's Chief Academic Officer:

This section includes a description of the administrative hierarchy of each selected university in relationship with the instructional design program. The channels of finance and communication regarding roles and facilities between the program and the institution's chief academic officer was determined.

3. Qualifications and Responsibilities of Program Advisory Group and of Program Administrative and Staff Personnel:

The nature and make-up of a program advisory group (if any) was analyzed and the qualifications and functions of the administrative and staff personnel are expressed. Responsibilities of these groups were explored, and their interaction activity is analyzed in depth.

4. Specific Methods of Program Evaluation:

Methods of program evaluation were determined and are described.

The broad purposes of institutions of higher education are similar; however, each instructional design program is unique within its institution. Personalities, traditions, and budget restrictions have direct influence upon the style of the instructional design program. Because of this style variation, specific procedures of one program may differ slightly from those of the other institutions. Basic

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[8]Brown and Thornton, loc. cit.

characteristics of these instructional design programs appear to be universal from one institution to other institutions.

CHAPTER II

REVIEW OF LITERATURE

This review of literature section is basically a descriptive analysis of instructional design development with instructional technology evolution in relationship to the learning process. These relationships have been critical and are gradually developing in institutions of higher education.

Methods and media of communications, patterns of planning, strategies of utilization, and modern logistics of learning are being organized into instructional (learning) system design programs for securing more effective and efficient learning. To cope adequately with the urgent needs and problems of education in a swiftly changing technological culture, instructional design programs structure a functional systematic approach which is dynamic in nature for communication and learning.

Instructional technology writer, Paul Saettler, expresses that what is urgently needed are integrated, organized systems of instruction. All of these system components (including professional and classified staff members) of the instructional process should be designed integrally into a program that is ultimately capable of providing individualized instruction for each learner.[1]

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[1]Paul Saettler, A History of Instructional Technology (New York: McGraw-Hill Book Company, 1960), p. 270.

Since the beginning of the industrial revolution, the "system engineering" concept -- invention, design, and integration of an entire assembly of equipment geared to the accomplishment of a broad objective has been fundamental to practical engineering. The United States Air Force in the early 1950's formalized the systems concept with the emergence of the systems analyst, programmer, and systems designer. The term "systems approach" was coined to combat the concept that only equipment (hardware) is important to a successful system.[2]

Modern concepts of instructional systems approaches can be linked with a general system approach which Ludwig von Bertalanffy developed almost a half century ago in the field of biology. He perceives a living organism not as collective elements of separate parts but as a definite system which possesses organization and wholeness. An organism may be viewed as a "growth system" which maintains a continuing state while changing as varied matter, energy and influences enter. This process known as "dynamic equilibrium" places emphasis on the continual interaction of sub-systems operating as functional processes. Bertalanffy explains, in biological terms, a living organism is a sub-system with behavioristic elements which is influenced by a larger system, the environment. An individual is interactive rather than reactive and exchanges energy and information with the environment.

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[2]Ibid.

Life has purpose, is self-regulating and actively inquires as it manipulates its environment.[3]

Paul Saettler parallels Bertalanffy's biological organismic systems concept with systems approach in a learning setting:

> The instructional system is a man-made system which has a dynamic interaction with its environment--teachers, learners, instructional resources, procedures, administrators, school board, parents, local community, government, and many other agencies. Furthermore, the instructional system is a system of interrelated parts working in conjunction with each other in order to accomplish a number of goals.[4]

One of the earliest published references concerning systems-thinking for instruction appeared only recently in 1956. In this editorial featured in Teaching Tools, writer James Finn contrasts the systems concept of military and industrial domains with public educational institutions:

> Essentially, the "systems concept" is an idea of organization. It is an idea of organization that includes what might be called the gestalt or whole function of a unit of organization. Thus, in advanced management research circles today, "men-machine systems" and "machine-systems" are carefully set up and studied. When an aircraft-bomber or commercial-is in the air, it consists of an intricate system of men and machines made up of smaller unit systems of men and machines. To make that aircraft accomplish its objective - whether to deliver a bomb or a sack of mail - it is necessary that the system as a whole be managed. What is important is not the physical and psychological condition of the pilots, the electronic devices, the code used with the tower, each taken separately, but the gestalt or field of all these items

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[3]Ludwig von Bertalanffy, Problems of Life: An Evaluation of Modern Biological Thought (New York: John Wiley and Sons, Inc. 1952).

[4]Saettler, op. cit., p. 272.

and many more, considered as they interact with each other in a system.

For an audiovisual program - and this is the heart of our argument - is a clear-cut system. The system begins with the production of materials - films, pre-recorded tapes or even a classroom bulletin board - and ends with the recovery or replacement of the materials. It is a man-machine. Involved, within the school situation, are people--teachers, administrators, students, clerical and technical help; materials, machines, other systems (delivery, for example), and outside institutions - dealers, producers, distributors, to name some of the larger units.

Professional audiovisual directors are also not without fault in this matter. In many cases, perhaps for very good reasons, but true nevertheless, the audiovisual director thinks and operates in an atomistic fashion, as opposed to the fact that he should be managing a system. His system extends from the producer to teacher and class back to producer again. But he spends his time with booking forms or equipment repair or previewing committees - operating all the time in a piecemeal fashion.

The audiovisual movement is relatively young. It is also geared into the technological world of the future - a world of interlocking, complicated systems of men and machines. It cannot be administered under a theory useful for the production of buggy whips. We need a new audiovisual systems theory; we need it NOW.[5]

During 1958, C. R. Carpenter and L. P. Greenhill of Pennsylvania State University documented the first total systematic approach in the utilization of closed circuit television.[6]

The consideration of a systems approach to instruction was limited until 1960, and early involvement originated from the rationale

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[5]James D. Finn, "AV Development and the Concept of Systems," Teaching Tools, Fall, 1956, p. 4.

[6]C. R. Carpenter and L. P. Greenhill, An Investigation of Closed Circuit Television for Teaching University Courses, Report No. 5 (Pittsburg: The Pennsylvania State University, 1958).

for logistical support demands. During this period of time, the term "total systems approach" was popular and connotes the interaction of men and technical equipment within the context of an organization with general goals and specific outputs.

Carpenter was featured in 1960 at a Stanford University symposium for educational television. He expresses his pragmatic systems approach definition:

> 1. Achievement or performance goals are defined. 2. These goals are then translated into sub-systems of general and specific functions. 3. The means of executing these functions are specified, and components of the systems are defined to include human capabilities, machines, materials and their interaction in the system. 4. Distinctions are made between those functions which can best be performed by instrumentation and materials with known characteristics. 5. Schedules and sequences of events are so planned that all components of the system, sub-systems, and functions operate as required and in an orderly manner. The designed system, when tested and re-tested, may have its components changed or re-ordered to maximize the performance of the system as a whole in accomplishing projected goals or objectives.
>
> A systems design for an educational enterprise would provide a conceptual framework for planning, orderly consideration of functions and resources, including personnel and technical facilities such as television, the kinds and amount of resources needed, and a phased and ordered sequence of events leading to the accomplishment of specified and operationally defined achievements. A systems approach should provide a way of checking on the relation of performances of all components to factors of economy and should reveal any inadequacies of the several components, including the faults of timing and consequently of the entire system.[7]

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[7]C. R. Carpenter, "Approaches to Promising Areas of Research in the Field of Instructional Television," Wilbur Schramm (ed.), New Teaching Aids for the American Classroom (Stanford: The Institute for Communications Research, Stanford University, 1960), pp. 24-38.

At this Stanford University symposium, Charles Hoban accentuates the merit of the systems approach to instruction: "If we are to cope adequately in educational media research and in the implementation of research findings, use of the systems concept is intellectually and practically inescapable.[8]

Evolving the instructional technology concept, W. C. Meierhenry has been instrumental in identifying the need for learning theory in this process. He emphasizes that during the period from 1930 to 1946, minimum development had been evident in theory-oriented research. He notes that "of the pertinent earlier work, Mark A. May has reported research as far back as 1946 on experimental motion pictures designed and produced to permit examination of certain psychological theories."[9]

In reinforcing this emerging concern as reflected in the association of learning and educational technology, H. A. Bern suggests:

> For problems involving such systems (educational technology), we might better contact persons in the area of operations, research, and systems engineering. From them we might gain expertise about cueing theory, simulation techniques, linear programming, information theory, systems dynamics theory, etc. These (procedures and theories) have apparently already had some success in solving control and management problems of complex systems.[10]

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[8]Charles F. Hoban, "Implications of Theory for Research and Implementation in the New Media," Wilber Schramm (ed.). New Teaching Aids for the American Classroom (Stanford: The Institute for Communications Research, Stanford University, 1960), p. 46.

[9]Wesley C. Meierhenry (ed.), "Learning Theory and AV Utilization." AV Communication Review, IX (September-October, 1961), 3.

[10]H. A. Bern, "Audio-Visual Engineers?" AV Communication Review, IX (July-August, 1961), 193.

During March, 1962, a conference on theory for the new media in education was conducted at Michigan State University, East Lansing. Significant keynoting addresses which further the instructional technology concept were delivered by Charles F. Hoban and H. A. Bern. In broadening this approach (instructional technology), concern was expressed with the technological hardware and systems and management of learning rather than emphasis for graphic communication.

Hoban identifies the machine (technological instrument) as the common characteristic of educational media:

> We arrive at a broader and more useful concept, that of an educational technology. When we consider the part machines play in education, we are forced into a consideration of man/machines systems. When we consider man/machines systems, we are forced into a consideration of technology. By a process of progressive forcing, we advance to the broader concept of educational technology or technology in education as a central subject to which we must relate theories, research, and educational practice.[11]

Bern, at this 1962 Michigan State Conference, placed instructional technology in perspective with a dichotomy ranging from the molecular to the molar. The molecular end of this continuum represents historically older problems of the sensory versus abstract symbol elements. The other extreme of the continuum (the molar end) presents uncharted

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[11]Charles J. Hoban, Jr., "Implications of Theory for Research and Implementation in the New Media," Wilber Schramm (ed.). New Teaching Aids for the American Classroom (Stanford: The Institute for Communications Research, Stanford University, 1962), p. 46.

problems of instruction conceived within a systems engineering (or instructional design) framework.[12]

In 1962, Occasional Paper No. 6, Studies in the Growth of Instructional Technology, I; Audio-Visual Instrumentation for Instruction in the Public Schools, 1930-1960: A Basis for Take-Off, was prepared for the Technological Development Project. This project funded by the National Defense Education Act of 1958 has the following goal:

> It is the mission of the Technological Development Project to attempt an assessment of technological revolution in education. We (Finn, Perrin, and Campion) view the present educational culture as analogous to an underdeveloped culture under assault by technology from the co-existing, highly sophisticated cultures of industry, business, and even certain sectors of the government, such as the military and scientific sectors.[13]

Finn believes that American education has not reaped its just share of economic prosperity and modern technology:

> . . .education, as a sector of national life, has, for the most part, been cut off from technological advances enjoyed by industry, business, military establishment, etc. The American education enterprise exists out of technological balance with great sectors of the society. As such, it can be viewed as a relatively primitive or underdeveloped culture existing between and among highly sophisticated technological cultures.[14]

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[12]H. A. Bern, "Towards the Reduction of a Difference-Signal." Conference on Theory for the New Media in Education (East Lansing: Michigan State University, March, 1962).

[13]James D. Finn, Donald G. Perrin, and Lee E. Campion, Studies in the Growth of Instructional Technology I: Audio Visual Instrumentation for Instruction in the Public Schools, 1930-1960: A Basis for Take-Off (Washington, D.C.: Department of Audiovisual Instruction, National Education Association, 1962), p. 2.

[14]Ibid., p. 1.

In a later published text entitled Educational Technology, John DeCecco states that Finn's prophecy is attractive; however, it should be accepted with caution. In the development of programmed instruction, DeCecco mentions that equipment or machines are produced more quickly than the construction of programs for them. Industry and business are able to work with much more uniform materials and products than education can. Many complexities of the learning task and a wide variety of learner ability ranges complicate instructional resources production. The end product of education is the scholastic achievement and social and personal development of each learner. Educators shall always experience learner variability because of natural individualistic differences. If educational technology is not only hardware but also a body of knowledge which guides instructional practice, critics may not record that such knowledge is a mere aspiration but rather a reality.[15]

Members of a research committee of the Department of Audiovisual Instruction with Chairman Wesley C. Meierhenry, identifies important areas for technological research:

> Systems and operation studies concerned with the cumulative effect of media, teachers, teaching method, organization of instruction, and logistical supporters are needed. Especially helpful would be studies assigning weights to relative contributions of each factor in the total product or outcomes of

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[15]John P. DeCecco, Educational Technology (New York: Holt, Rinehart, and Winston, 1964), pp. 13-14.

the instruction, and relating each to costs, time distribution, etc.[16]

R. M. Gagne extended in 1962 a systematic approach for instruction with three major parts in the human factors section--the design stage, the development stage, and the testing stage. Preceding the design stage are the functions of deriving a statement of the purpose of the system and an advanced operations design for the system. Included in the design stage are task descriptions, task analysis, and job design. The development stage includes job aids, personnel selection and classification, individual training, training devices and performance measures. Team training precedes the testing stage which is followed by systems evaluation and systems operation.[17]

John Gilpin in 1962 cautions that the main focus of development of instructional science should be in criterion-specification and measurement, not in methods of presentation. A technology of instruction cannot be produced until an institution specifies goals and determines a means of evaluating results.[18]

During the fall of 1961, James Brown and James Thornton of San Jose State College submitted a joint proposal to the National Education

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[16]Wesley C. Meierhenry, "Needed Research in the Introduction and Use of Audiovisual Materials: A Special Report." AV Communication Review, X (November-December, 1962), 307.

[17]R. M. Gagne (ed.), Psychological Principles in System Development (New York: Holt, Rinehart and Winston), 1962.

[18]J. Gilpin, "Design and Evaluation of Instructional Systems," AV Communication Review, X (March-April, 1962), 82.

Association affiliates, the Division of Audiovisual Instructional Services (currently DAVI) and the Association for Higher Education. This proposal was accepted and cosponsored by the two NEA affiliates. A descriptive survey was initiated to analyze the scope and extent of media utilization in higher education.

New Media in Higher Education was published in 1963 as the result of Brown and Thornton's initiation and development with the planning assistance and criticism of four DAVI members and four AHE members.

In a chapter entitled, "The New Media in Higher Education: A Rationale," authors Brown and Thornton discuss the fear of technology. They quote the concerns of Bestor[19] and Griswold[20] that media in education may abort the reading development skills and lead to a dilution of subject matter or undue emphasis upon concrete experience at the expense of systematic development of intellectual skills. Bestor extends the concept that the human mind, above the lower grades, advances from pictures to words and abstract symbols. He contends that once the mind makes this advance, many types of "audiovisuals" become time-wasting, round-about, burdensome methods of conveying information that can be dissemated more quickly, accurately, and systematically by the printed or spoken word.

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[19]Arthur E. Bestor, Educational Wastelands (Urbana: University of Illinois Press, 1953).

[20]A. Whitney Griswold, "On Conversation, Chiefly Academic." In the University Tradition (New Haven: Yale University Press, 1957), pp. 34-48.

Concerning this dichotomy of multi-sensory media versus abstract symbols in advanced instructional levels, statements by Dr. Toch and Dr. MacLean on the transactional view of the instructional process and by Dr. Fearing on the communication status refute the critics' concept.[21] To decode meanings by verbal symbols or other signs and symbols is a most remarkable process of human communication. This transmission of meaning is completed only if other elements of past experience, present motivation, or affective state of learner provide an appropriate ground to close the sign-symbol circuit by which communication is effected.[22]

Edgar Dale probed the feelings of college faculty members who reject the instructional system design concept. First he finds that this approach has become a threat to some professor's academic privacy and autonomy. Dale says, "In a world that makes more and more intrusions upon his time and choices, his (the professor) feeling of self-esteem, the classroom is one place where the faculty member is the boss, where his dreams and ideals can hold full sway, where he can have some choice of what he is going to do. . . where do planning and systematizing end? What will prevent his being engulfed in an enforced coop-

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[21]Toch, Hans and MacLean, Malcolm S. Jr., "Perception, Communication and Educational Research: A Transactional View." AV Communication Review, X (September-October, 1962), 70.

[22]Kenneth Norberg (ed.), "Perception Theory and Audio-Visual Education," AV Communication Review, X (September-October, 1962), 83-108.

eration, a kind of intellectual collectivism?"[23]

New Media in Higher Education emphasizes that extensive conceptualization remains in terms of elaboration and justification of the systems approach in education:

> To many professional educators this notion (system concept), borrowed from engineering and industry, may seem harsh and even ominous in its implications for the management of instructional processes. Even so, there is something firm and indisputable in the idea that instructional planning in modern educational institutions cannot be conducted on a piecemeal basis and without some effort toward a rational and efficient deployment of human and technical resources. If only this much is granted, it becomes a matter of considerable interest to look toward the new media as a group of related technical instruments and to try to form some notion of their total force and character in higher education.[24]

The following criteria are listed as identifiable contributions of new media in higher education instruction: (1) improvement of teaching, (2) enrichment of teaching, (3) greater service to greater number, (4) conserving teacher time, (5) curricular enrichment, (6) independent study facilitation, (7) improved methods of teaching, (8) understanding learning theory, (9) variety of instruction, (10) changed conceptions of teaching, and (11) distribution of talent.[25]

A National Education Association publication entitled Monograph No. 1 of the Technological Development Project, (1963) is the result

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[23]Brown and Thornton, op. cit., p. 14.

[24]Ibid, p. 16.

[25]Ibid, pp. 166-171.

of 18 months of development by the Commission on Definition and Terminology. James D. Finn of the University of California was appointed principal investigator and Donald P. Ely of Syracuse University was named consulting investigator. The major rationale for this project is to identify definition and terminology. Considering that terminology can be borrowed or created and agreed upon by identified authorities in any given discipline, this monograph is developed to provide a needed stability to the instructional technology field. Hopefully, this effort has established an initial basis for clarification of communication and for discussion of philosophical implications.

This Commission on Definition and Terminology in 1963 took into account both current practices in terms of philosophy, theory, and management, and the practices in specialized areas of study and application that are inherent within an instructional system's complex of messages, media, men, and methods. "Technology" as an educational term is defined:

> A systematic body of facts and principles related to a comprehensive, practical, and useful end. This term is not limited to industry or to engineering. The principles of effective teaching (pedagogy), for example, comprise a technology.[26]

"Instructional Design" as a term is not identified in this 1963 monograph; however, the Commission includes, "Systems Approach" and

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[26]Donald P. Ely and James D. Finn, Monograph No. 1 of the Technological Development Project, Department of Health, Education and Welfare (Washington, D.C.: U.S. Government Printing Office, January, 1963), p. 38.

"Systems Design":

> Systems Approach - An integrated, programmed complex of instructional media, machinery, and personnel whose components are structured as a single unit with a schedule of time and sequential phasing. Its purpose is to insure that the components of the organic whole will be available with the proper characteristics at the proper time to contribute to the total system, and in so doing, to fulfill the goals which have been established.
>
> Systems Design (in Education) - Provides a conceptual framework for planning, orderly consideration of functions and resources, including personnel and technical facilities such as television, the kinds and amount of resources needed, and a phased and ordered sequence of events leading to the accomplishment of specified and operationally defined achievements. A systems approach should provide a way of checking on the relation of performance of all components to factors of economy, and should reveal any inadequacies of the several components, including the faults of timing and consequently of the entire system.[27]

In 1964, Edgar Dale identifies major tasks for education. One of the most important tasks which he identifies is to bring all technological devices into the services of a planned integrated program of education. Here he raises the questions, "How systematic can we be, should we be? At what point does over-systematizing make technicians out of teachers and trained mechanics out of pupils? When does a system liberate and when does it put minds in bondage?"[28]

He also places special emphasis upon determination of predictable learning outcomes, improvement of college teaching, and utiliza-

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[27] Ibid.

[28] Edgar Dale, "Many Things We See. . .and Some of Them We Are," Audiovisual Instruction, IX (May 1964), 266-267.

versities operate in a fluid situation where various, dynamic aspects of the culture are difficult to identify. This social flexibility and change establishes a major rationale for an educational institution to identify and to program for the various non-static forces which are influencing inputs. Increased research in the social and behavioral sciences becomes necessary. Since the initiation of the behavioristic approach, progress has been evident in the instructional technology field. Meierhenry suggests that we may be inhibited by current learning models. He advocates further research development of chemical changes which occur during the learning task and the involvement of the physiological factors in learning.[31]

In an effort to broaden the interpretation given the systems approach by some educators, the editors of Audiovisual Instruction in 1965 directed a number of definitive questions to specialists in the systems field. Basic to their study are the works of Gagne,[32] Maccia,[33] Miller,[34] Ryans,[35] Shannon,[36] Von Bertalanffy,[37] Weaver,[36]

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[31]Ibid.

[32]Robert M. Gagne (ed.), Psychological Principle in System Development (New York: Holt, Rinehart and Winston, 1962).

[33]George S. Maccia, An Educational Theory Model: General Systems Theory, Bureau of Educational Research and Service Occasional Paper 62-126 (Columbus: Ohio State University, December 1962).

[34]J. C. Miller, "Toward a General Theory for the Behavioral Sciences," American Psychology, X (1955), 513-531.

[35]David G. Ryans, An Information-System Approach to Theory of Instruction With Special Reference to the Teacher (Santa Monica, California: Systems Development Corp., March, 1963).

and Wiener.[38]

E. B. Montgomery of Syracuse University in that 1965 issue of AV Instruction responds to the question "What might be a systems approach to individuals?" This learning environment basically requires all parts to be blended into an integrated dynamic system. This article relates critical questions which must be asked in the analysis necessary for a systems approach to instruction:

1. What is the system under study?

    a. What is education?
    b. Who are the learners?
    c. What is the total result of this teaching and learning, etc?

2. What is it supposed to do?

    a. What are the educational objectives of the system?
    b. What are the financial and environmental factors which surround it, etc?

3. How is it supposed to do it?

    a. With what facilities?
    b. With what media?
    c. With what methods?
    d. With what materials is the educational system involved, etc.

4. What are the parts which achieve what is to be done?

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[36]C. E. Shannon and W. Weaver, The Mathematical Theory of Communication (Urbana: University of Illinois Press, 1949).

[37]Ludwig Von Bertalanffy, "An Outline of General Systems Theory." British Journal of Philosophical Science, I (1960), 148.

[38]N. Wiener, Cybernetics (New York: John Wiley & Sons, 1948).

5. What are the criteria for quality in the performance of the tasks?

6. How can a plan be put together for the system to perform and measure its performance against the criteria and improve this performance, all the while finding better definitions of excellence and better definitions of what it is supposed to do?[39]

John Barson has been successful in designing and implementing an instructional system at Michigan State University for the design of course development procedures. These development procedures refer to what can best be conceptualized as standard operating procedures for the implementation of a technological design of learning. The United States Office of Education has sponsored a two-year study, A Procedural and Cost Analysis Study of Media in Instructional Systems Development (OE3-16-030). This study expresses four stated purposes:

1. To do a descriptive analysis and evaluation of instructional systems development activities at Michigan State University from 1963-1965.

2. To devise methods of measuring costs associated with instructional systems development and to development principles of sound budgetary planning for the use of educational media in university instruction.

3. To develop hypothetical models of instructional systems development procedures and their relative costs.

4. To prepare descriptive reports of the above materials for use by other institutions of higher learning

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[39]E. B. Montgomery, "Reply to Questions About Systems," AV Instruction, X (May, 1965), 367-368.

> concerned with the application of technology to instructional programs.[40]

A distinction between "development system" and "instructional system" is expressed by Barson: "The development system is a set of procedures scheduling faculty member--specialist interaction for the purpose of designing instructional systems. An instructional system is the activity representing the decisions made in the developmental system."[41]

Basically the Michigan State University systems approach attempts to maintain better focus on the outputs by means of evaluation, research, and emphasis of the instructional importance. Importance is also placed on better identification of inputs and generally more effective arrangements of the parts of the system. Formally Barson defines the concept:

> An instructional system is a complex consisting of the following components: learner(s) and a combination of instructor(s), material(s), and technician(s), given certain inputs and designed to carry out a prescribed set of operations. This set of operations is devised and ordered according to the most recent and pertinent evidence from research and expert opinion such that the probability of attaining the output, specified behavioral changes in the components, is maximal.[42]

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[40]John Barson, John M. Gordon, Jr., and W. Russell Hornbaker, "Standard Operating Procedures for a Learning Resources Center: A System for Producing Systems," Audiovisual Instruction, X (May, 1965), 378-379.

[41]Ibid.

[42]Barson, Gordon, and Russell, op. cit.

One of the major purposes of this 1963-1965 M.S.U. study is dissemination of the instructional system concept for consideration by institutions of higher education. Figure I is a flow chart which expresses this hypothetical model. This model was implemented at Syracuse University, Michigan State University, the University of Colorado, and San Francisco State College. The Office of Education sponsored a two-year study of instructional development at these four major institutions of higher education. This study, Instructional Systems Development: A Demonstration and Evaluation Project (OE3-16-025), is an extension of the M.S.U. study for applying systems procedures to instructional development in higher education.[43]

Principal investigators of this research project tested and revised the instructional development model at each of the four demonstration institutions. The final summary report describes the major steps taken by the demonstration institutions in implementing a systematic approach to instructional planning; it contains an improved form of the development system; it includes diffusion data; it offers a prescription for the curriculums of substantive degree programs for system development specialists; and it presents comparative cost data for instructional systems development.

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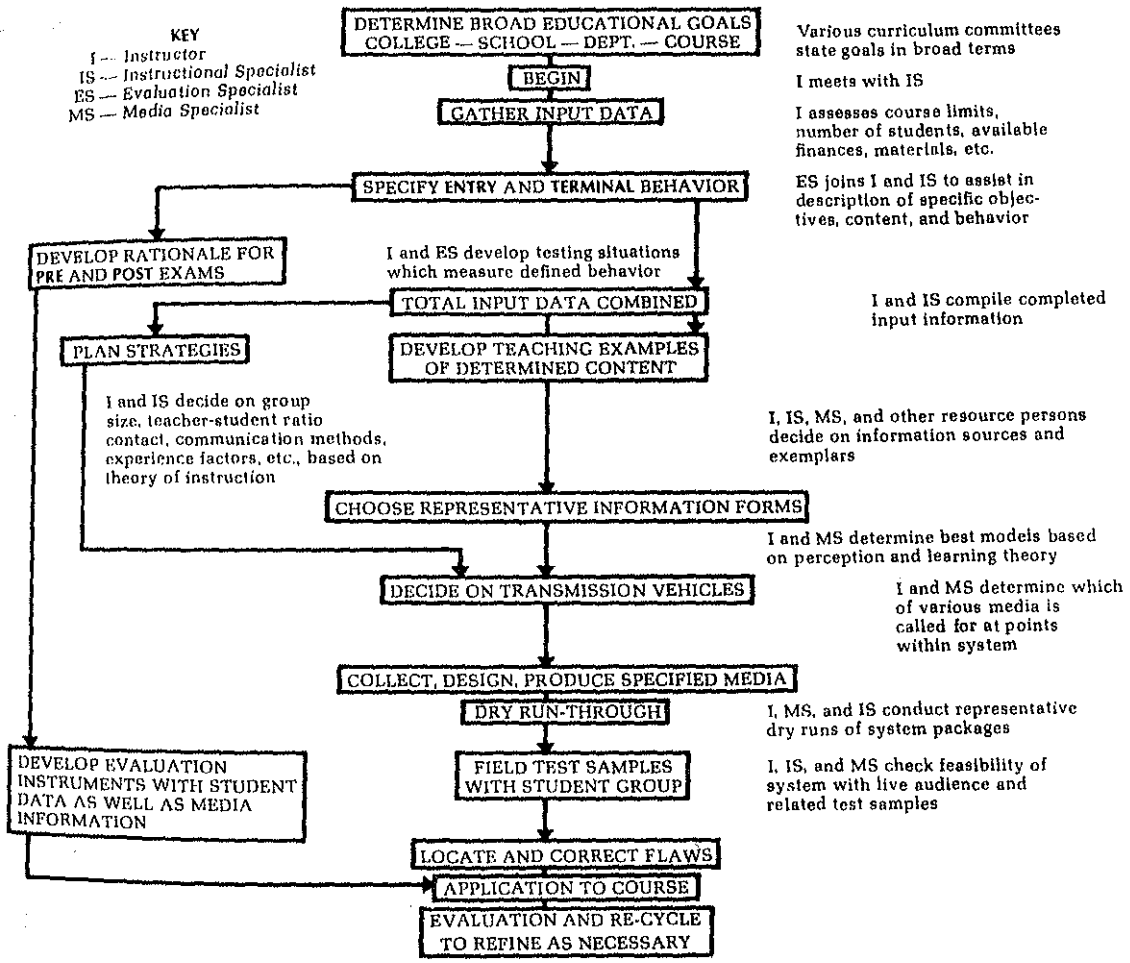
[43]John Barson, et. al. Instructional Systems Development: A Demonstration and Evaluation Project, a research performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education and Welfare, Final Report, Project No. 3-16-025 (East Lansing: Michigan State University, 1968), p. 4.

A FLOW CHART* OF PROCEDURES FOR ANALYSIS OF INSTRUCTION AND IMPLEMENTATION OF NEWER MEDIA OF COMMUNICATIONS



*Note: Information feedback loops have been deleted from this illustration.

A follow-up paper entitled "The Heuristic Dimension of Instructional Development" in which the research project evaluators and development teams perceived an infrastructure of instructional design operating practices and patterns that in the past have often been ascribed to common sense. This paper relates the significance in this aspect of instructional development and proposes heuristics (successive discovery--action research to guide future action) for instructional design guidelines.

Eighteen proposed heuristics are offered:

Heuristic # 1 - Always move toward determining the professor's objectives.

Heuristic # 2 - The development of software is dearer than the acquisition of hardware.

Heuristic # 3 - The development of software is a continuous process.

Heuristic # 4 - Involve the student in the development process.

Heuristic # 5 - The model for instructional systems development is universal in only a general way.

Heuristic # 6 - Stress the human elements in an instructional system.

Heuristic # 7 - Proceed on the basis of agreement.

Heuristic # 8 - Don't let words get in the way.

Heuristic # 9 - Seek out dirty jobs.

Heuristic #10 - Learn the professor first.

Heuristic #11 - See that faculty members are rewarded for work in instructional development.

Heuristic #12 - Structure the conditions for survivability.

Heuristic #13 - Structure the conditions for transferabiltiy.

Heuristic #14 - Don't let subject matter interfere with an understanding of process.

Heuristic #15 - When you abstract reality, you also reduce the learning experience.

Heuristic #16 - Find the pattern or format that will balance benefits and liabilities.

Heuristic #17 - Faculty members are not generally moved to change their behavior by reading reports of instructional research.

Heuristic #18 - Nothing persuades like a visit, but watch out! Nothing deflates like a deluded visitor.[44]

Robert Heinich in a 1965 monograph entitled The Systems Engineering of Education II: Application of Systems Thinking to Instruction continues the clarification of the emerging role of instructional technology:

> Television, language laboratories, and programmed instruction, unlike traditional audiovisual materials, must be functional in the instructional system at the curriculum planning phase.
>
> The recent shift from emphasis of classroom instruction to the curriculum planning function has been responsible for finally alerting instructional technology to the importance of the systems approach. It is also why audiovisual, as a designation of a group of media, is subsumed instructional technology.[45]

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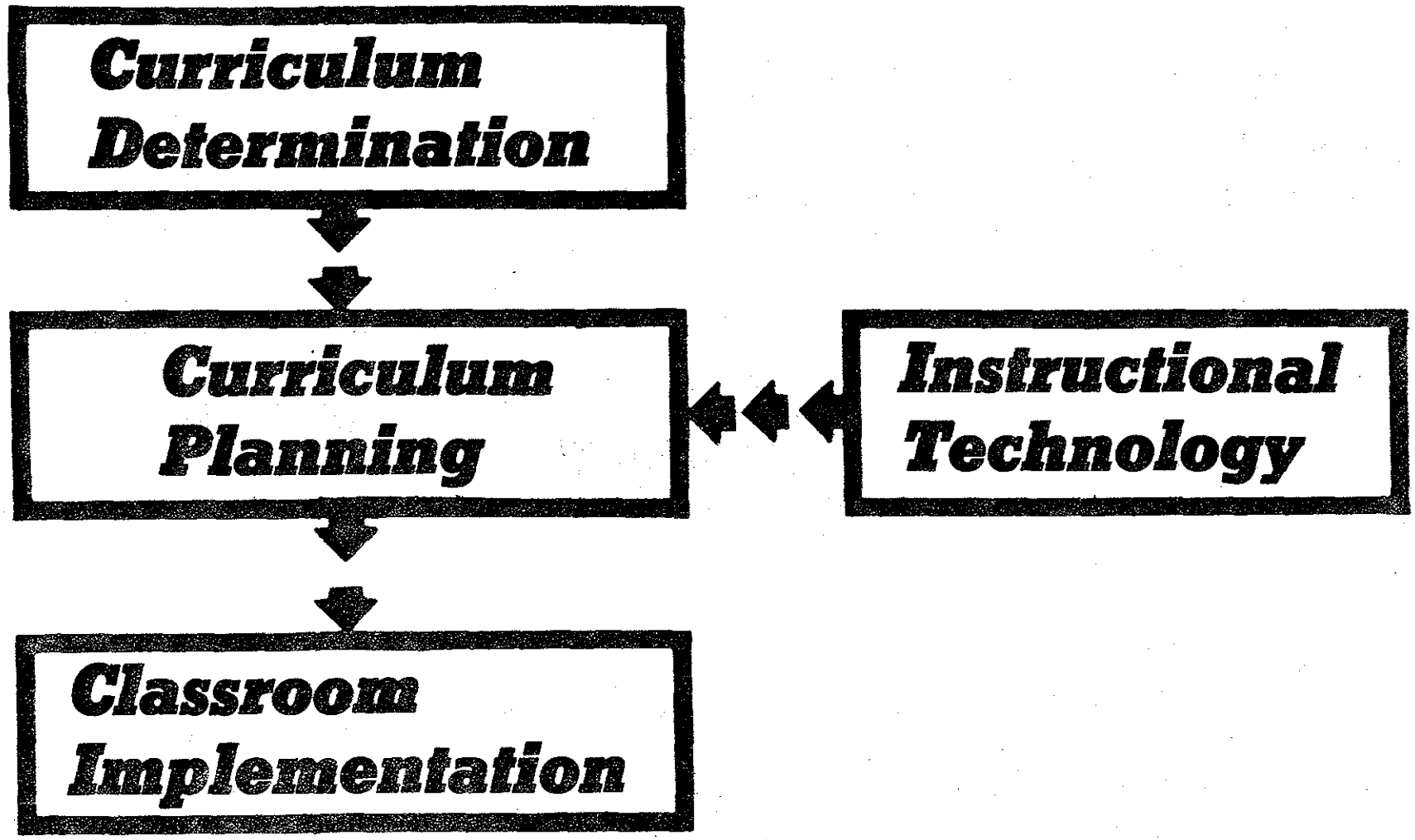
[44]John Barson, John B. Haney, and Phil C. Lange. "The Heuristic Dimension of Instructional Development." AV Communications Review, XVI (Winter, 1968), 358-371.

[45]Robert Heinich, The Systems Engineering of Education II: Application of Systems Thinking to Instruction, a monograph prepared for Instructional Technology and Media Project (Los Angeles: School of Education, University of Southern California, 1965), p. 15.


Curriculum Determination
Curriculum Planning
Instructional Technology
Classroom Implementation

Heinich explains that design of instructional procedures and materials is the primary concern of instructional technology, leaving dissemination, procurement, and distribution to library services. He further identifies three levels of operation: systems design, media instrumentation design, and procurement and distribution. He emphasizes that logistical support requirements must consider instructional as well as material demands.

Heinich in conclusion says:

> Instructional technology has entered the instructional process at the curriculum planning and development stage. What is still lacking is a clear indication in which direction audiovisual personnel will move. They can reject the curriculum role in which case they will finally settle on the librarian level, or they can accept the challenge and move in next to the curriculum director. One thing is certain: the inherent curriculum planning and development aspects or newer media will be picked up by someone. . .if not by audiovisual personnel, then certainly by curriculum personnel.[46]

When Charles F. Hoban in a 1965 AV Communication Review article analyzes the role of educational media, he concludes, as he had before in 1962, that one is forced into a consideration of man/machine systems of "technology." He advances a broad concept of educational technology or technology in education, as a central subject to which one must relate theories, research, and educational practice. He differentiates between media and technology, and elaborates technology's top priority:

> The point here is that the term *educational media* does not in itself suggest the ramifications for research, educational policy, and operating procedures which are inherent in the

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[46] Ibid., p. 37.

> term *technology of education.* Technology is not just machines and men. It is a complex, integrated organization of men and machines, of ideas, or procedures, and of management. The introduction of this complex generates many systematic problems that can be, and have been, either ignored or generally neglected in theory, research, and practice in education. The term "educational media" *limits;* and the term "educational technology" *expands* the areas of theoretical development, research, and implementation in education.
>
> It is frequently said by educators and educational researchers that the central problem of education is learning. Learning is a process central to human survival. The central problem of education is *not* learning, but the management of learning. Learning and the management of learning are *not* equivalent terms, any more than are learning and teaching. The so-called teaching-learning problem is subsumed *under* the management-of-learning problem.[47]

Some difference concerning the act of learning and the act of instruction is noted by Gage:

> Although theories of learning are necessary to the understanding, prediction, and control of the learning process, they cannot suffice in education. The goal of education--to engender learning in the most desirable and efficient ways possible--would seem to require an additional science and technology of teaching. To satisfy the practical demands of education, theories of learning must be "stood on their head" so as to yield theories of teaching.[48]

The official association of the media profession, Department of Audio-Visual Instruction, now the Association for Educational Communications and Technology, has initiated a task force headed by Barry

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[47]Charles F. Hoban, "From Theory to Policy Decision," AV Communication Review, XIII (Summer, 1965), 124.

[48]N. L. Gage, "Theories of Teaching," Theories of Learning and Instruction, Sixty-Third Yearbook of the National Society for The Study of Education, ed. Ernest Hilgard (Chicago: University of Chicago Press, 1964), pp. 168-169.

Morris, This DAVI-sponsored group, recognizing the necessity of exploring a systems approach to instruction, states, "the umbilical cord to media, per se, has not yet been cut--and needs to be."[49]

William A. Deterline identifies "multimedia instructional systems" as the term in greatest favor in 1965. This indicates the move into new, more complex, but more appropriate considerations of the design of multi-media. Potentialities of all media in his estimation will never be realized until technology replaces intuition. He defines instructional technology: "It is the application of behavioral technology to the systematic production of specified behaviors for instructional purposes, and I (Deterline) suspect that empirically developed instructional technology will, in the long run, have a far greater effect on learning theories than learning theories have contributed to instructional technology."[50]

Carlton W. H. Erickson of the University of Conneticut in 1965 authored a text entitled Fundamentals of Teaching With AUDIOVISUAL TECHNOLOGY. In a preface passage he explains that his book is about instructional technology as applied professionally to the achievement of educational objectives. In his publication he explains to the stu-

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[49]Leonard C. Silvern, Studies in the Systems Engineering of Education I: The Evolution of Systems Thinking in Education. A monograph prepared for the Instructional Technology and Media Project (Los Angeles: School of Education, University of Southern California, 1965).

[50]William A. Deterline, "Learning Theory, Teaching, and Instructional Technology," AV Communication Review, XIII (Winter, 1965), 407-411.

dent "Develop insight into end-and-means relationships, develop the basic abilities to make instructional designs, identify a breadth of teaching purposes, plan and implement appropriate problem-solving activities, and relate creatively the common educational media with maximum impact to those learning activities."[51]

Robert Glaser writes ". . .at this point in time (1966), an entity known as an 'educational technologist' hardly exists in our society." He then describes and discusses a framework in which a proposed "instructional designer" might carry out his job. The design components which he proposes can be classified as a systematic approach: 1) analyzing the characteristics of subject-matter competence, 2) diagnosing preinstructional behavior, 3) carrying out the instructional process, and 4) measuring learning outcomes.[52]

In identifying the instructional designer's task of priorities, Glaser offers the following descriptions:

> First, this psychologist-instructional designer would analyze the subject-matter domain he is considering--reading, mathematics, and so forth. He would think of a domain in terms of the performance competencies which comprise it. He would analyze representative instances of subject-matter competence in terms of the stimulus characteristics of the content to be attended to, and the properties of the responses the student makes to the content (by responses is meant broad activity ranging from memorizing to concept learning to problems solving); he would further analyze the structural char-

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[51]Carlton W. H. Erickson, Fundamentals of Teaching With AUDIOVISUAL TECHNOLOGY (New York: The Macmillan Company, 1965), p. vii.

[52]Robert Glaser, "Psychological Bases for Instructional Design," AV Communication Review, XIV (Winter, 1966), 433-434.

> acteristics of the domain, perhaps in terms of its hierarchies and operating rules. Second, the instructional designer would turn his attention to the characteristics of the students that are to be taught. He would need to determine the extent to which the students have already acquired some of the things to be learned, the extent to which they have certain content prerequisites, the extent to which their antecedent learnings might facilitate or interfere with the new learning, and the extent to which the students have certain aptitude-like prerequisites consisting of necessary sensory discrimination and motor skills.
>
> These first two steps conceivably provide some information to the educational designer about the target performance to be obtained and the existing preinstructional behavior of the learner. The designer must now proceed to get from one state to the other. This sets up his third task, which consists of guiding or allowing the student to go from the preinstructional behavioral state to a state of subject-matter competence. This requires the construction of teaching procedures and materials that are to be employed in the educational process. As part of this process, the educational designer must take account of motivational effects and the conditions which will result in the maintenance and extension of the competence being taught. Finally, the educational designer must make provision for assessing and evaluating the nature of the competence and kind of knowledge achieved by the learner in relation to some performance criteria that have been established.[53]

Robert W. Locke supports Glaser's educational technology concept. Locke, who is a senior vice-president of the McGraw-Hill Book Company, says, "I like best the definition by Robert Glaser in which he describes educational technology as 'instructional design.' He (Glaser) describes the process of educational technology rather than the products which

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[53] Ibid.

are its physical outcomes."[54]

These task criteria basically parallels instructional systems designs which are described in earlier sections of this review of literature chapter. The design components can be structured into four areas: (1) analyzation of subject-matter competence characteristics, (2) determination of initial levels of behavior, (3) implementation of the instructional program, and (4) evaluation of learning achievement.

In 1967, a report was prepared by the Instructional Methods Program of the Center for Research and Evaluation in Applications of Technology in Education (CREATE). This monograph has been developed for the improvement of instruction through development of an analytical procedure for the selection of instructional media. It constitutes a basis for matching media with educational objectives. This procedure for the design of "multi-media instruction" is both a critical review of research and a rationale for future research.

A thesis is presented that educational specialists, rather than either commercial producers of educational materials or specialists in particular media, should select the media by which instruction will be presented. The selection should take place through an analysis of educational objectives; this analysis should be performed at the time of the original design of the curriculum. The resulting specifications for sequences of instruction in the selected media should guide the

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[54]Robert W. Locke, "Educational Technology and the Educational Publisher." Educational Technology. VIII (January 15, 1968), 14.

actual production of instructional material. Thus the educational personnel who are responsible for the conducting of the instruction would also become the selectors of the media. The selection of media would take place before the materials are produced, not afterwards. The basis for the analysis by which media are matched to objectives should involve the use of the most dependable and general knowledge available concerning the conditions of instruction required for each type of learning represented in the educational objectives.[55]

This comprehensive critical review of research offers four general areas for suggested future research:

> First, concerning method of analysis for selecting educational media, several types of follow-up work need to be accomplished. Additional research needed is as follows:
>
> 1. Study of the extent of agreement among professional people in applying the various steps of the procedure to a particular set of objectives.
>
> 2. A listing of examples, from a wide variety of subject-matter areas, of behavioral objectives representing the various kinds of learning. Such a list would help persons conducting the first step in the recommended procedure.
>
> 3. Empirical test, evaluation, and improvement of the procedure, by preparing at least two different courses (or course units) by the procedures outlined in this report, and comparing learning results with results from any other proposed method for the design of multi-media instruction.

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[55]Leslie J. Briggs, Peggie L. Campeau, Robert M. Gagne, and Mark A. May. Instructional Media: A Procedure for the Design of Multi-Media Instruction, A Critical Review of Research, and Suggestions for Future Research (Pittsburg: American Institutes for Research, 1967), p. 143.

4. Empirical comparison of the effectiveness of the above multi-media packages with the effectiveness of any single medium of instruction designed with equal care.

5. Continued search for general guidelines, or rules of thumb, which might aid practitioners in conducting the type of analysis here advocated.

6. Preparation of a "Media Taxonomy" which would list both commonly known and unusual, or potential, features, stimulus dimensions, and instructional functions which can be provided by various media.

7. Expansion of the system of analysis to account for individual difference and situational variables.

8. Applied research to evaluate particular media options for specific objectives to validate judgments and to aid in the search for new generalizable insights.

Second, alternate approaches to procedures for matching media with objectives deserve to be made. The over-all problem appears sufficiently important to education to justify several independent attempts to find the most effective and most practical procedure for choosing effective media of instruction.

Third, research to improve the usefulness of the various individual media should be continued. Such research is complementary to the matter of choice of media.

Fourth, further research is needed in particular matters which are related to the effectiveness with which the presently proposed method of analysis may be applied in practice.

1. Studies of the interaction effects of individual characteristics of the learner, types of learning, kinds of media, and situational variables in the use of media.

2. Studies of the attitudes, abilities, and techniques of teachers who effectively employ media of instruction.

3. Study of ways to use instructional media to overcome subject-matter and pedagogical deficiencies in the training of teachers.

4. Study of the utilization of media in relation to the special problems of education: the retarded or underprivileged; the vocational trainee; the superior student.

5. Study of the capabilities of computers and new kinds of AV control and integrating mechanisms for the presentation of instruction; study of the capabilities of computers for making branching decisions for individualized instruction.

6. Study of methods for specifying media requirements in the form most helpful to the specialists who will develop the instruction in the various media.

7. Integration of new curriculum approaches with new instructional approaches.

8. Continued study of the programming techniques which are effective for each of the media.

9. Study of the role of the teacher in multi-media instruction.

10. Research on ways to introduce young children to special effects utilized in media: perceiving a picture of a horse in terms of "real size"; translating relative magnitudes in pictorial presentations (meters, centimeters) to "real dimension"; perception of "freeze frames" as distinguished from motion portrayed by a film.

11. Analysis of factors in the relative effectiveness of personal experiences with objects and materials, as compared to watching live demonstrations or seeing filmed demonstrations.

12. Analysis of the role of manipulation of real objects versus pictorial representation in concept formation by young children, the continuing search for improving the effectiveness of visual media.

13. Continued study of the kinds of concepts for which various sequences of stimulation are effective: visual, then verbal; verbal, then visual; simultaneous audiovisual, then verbal, etc.

14. Increased basic research in the "higher forms of learning" concept formation; principle learning; problem solving.[56]

All of the preceding recommendations are sufficiently promising to establish a basic framework for the task of curriculum or instructional design.

An article entitled "An Instructional Systems Approach to Course Design" summarizes and advocates a methodology for course development. The author, Michael R. Eraut, considers a course as an instructional system. He writes, "The components of the system are the learners, the instructor(s), the material(s), the machine(s), and the technicians. The input is the learners' initial knowledge and the output is the learners' final knowledge."[57]

The purpose of course development is to design validated instruction that is guaranteed to convert any input which meets the input specifications to an output that meets the instructional system's output specifications. In order to validate instruction, two essential requirements of a research and development process are needed. First a comprehensive test of the system's output is needed to assess the efficiency of the system. Secondly, sufficient data from the testing of the system are vital for identification of the deficiencies and sug-

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[56]Ibid., pp. 147-150.

[57]Michael R. Eraut, "An Instructional Systems Approach to Course Development," Robert T. Filep (ed.), "Teaching Machines and Programmed Instruction," AV Communication Review, XV (Spring, 1967), 92-93.

gestion of revision for an efficiency increase.[58]

Robert F. Mager also outlines a unique set of skills for the "instructional technologist." He explains in 1967 that if such a person (the instructional technologist) did exist, there would be certain tasks in applying the state of the art. First the instructional technologists would be familiar with the laws of nature which relate to behavioral change (principles of learning) and to their application. Secondly, he would be able to derive and describe instructional goals in forms that are learner oriented. Third, he would identify environmental characteristics that facilitate and inhibit the desired behavioral changes. Fourth, he could describe the characteristics of a wide variety of learning resources and technological instruments. At this time, he would be able to compare these characteristics with goals to systematically identify if all implemented learning resources and technological instruments were most appropriate to a given situation. Finally, he could construct criterion instruments for measuring learner accomplishment.[59]

He emphasizes that the essence of modern instructional technology makes possible a means to derive and specify learning objectives, to select instructional procedures and to evaluate success at reaching pre-specified educational intents.

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[58]Ibid.

[59]Robert F. Mager, "The Instructional Technologist." Educational Technology, VIII (May 15, 1967), 1.

An exclusive report and analysis of the changing directions in American education is a feature of a 1967 issue of Saturday Review. This annual report by the Committee for Economic Development made the following comment concerning the "systems" approach as an "economic" approach to education: "A rational, systematic approach to education can promote greater innovation because it produces continuous, dynamic modifications. And it will produce greater efficiency, because the precision, care, and attention to each step in the process is controlled and measured to produce that efficiency."[60]

When the National Education Association DAVI's newly appointed President, Wesley C. Meierhenry, in 1967 delivered his acceptance remarks, he said, "We are concerned with design and instructional systems, and we are concerned with evaluation, testing, and validation, as well as research in general."[61]

Logan Wilson, past president of the American Council on Education, stresses that education's primary obligation to students in residence is a top priority for the teaching function. He refutes the "publish or perish" concept as an element in placing emphasis on the research priority. He states, ". . .in all except a few leading institutions, less than ten per cent of the faculty accounts for ninety

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[60]C. H. Springer, "The Systems Approach" Saturday Review, L (January 14, 1967), 56-58.

[61]Daniel V. Mattox, Jr., "The Media Field in Transition." Audiovisual Instruction, XII (June-July, 1967), 579.

per cent or more of all published research. Does the individual researcher owe his first loyalty to his university, to his discipline, or to the funding agency? . . .trim the output of needless publication and upgrade the quality of instruction by a more realistic adjustment of the talents available."[62]

To review the pattern of fulltime higher education in Great Britian, a committee was appointed by the Prime Minister. This committee was charged with a two-fold task. First, an analysis was conducted to determine the extent of university response to the changes of higher education during the century. Three major changes which were identified include: a change in the financial position of universities, including the steady growth of dependence upon government funding. Second, is a rise of higher education in institutions other than universities. Third, is a general extension of educational opportunity leading to a great quickening of the desire for higher education on the part of rising generations. The committee's second task was to define four aims of higher education:

> 1. Higher education should give instruction in skills suitable to play a part in the general division of labour. This is the economic aim; the need for higher education to meet national requirements and material prosperity.
>
> 2. 'What is taught should be taught in such a way as to promote the general power of the mind.' This is an extension of the economic aim since at a time of technological change a nation will need leaders, particularly in

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[62]Logan Wilson. "Setting Institutional Priorities," Ohmer Milton and Edward J. Shoben (eds.), Learning and the Professors (Athens, Ohio: Ohio University Press, 1968), pp. 33-34.

> administration and politics, who may be specialists but whose higher education has imparted to them practical techniques on the plane of generality that makes it possible for them to be applied to all problems of national life.
>
> 3. The third aim is 'the advancement of learning.' This is the research aim, and the recognition that the search for truth as an essential function of higher education includes the belief that teaching in universities will be most vital when it partakes itself of the nature of discovery.
>
> 4. The fourth aim is the provision 'in partnership with the family, that background of culture and social habit upon which a healthy society depends.'[63]

Critics of these stated aims argue that the four statements are "extrinsic" and omit the basic "intrinsic" aim. If research is conducted for its own sake and not as a means to an end, production of second rate research may result. A university professor who places research in a higher priority than teaching may be more concerned to ensure that students learn the latest developments in his discipline than to use that subject as a means of developing the students' power of thinking.[64]

Paul Witt in a 1968 publication urges fellow educators in curriculum and teacher educators to help clarify the role of the media specialist. He emphasizes that this individual can provide assistance in the development of the total educational program as well as that

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[63] B. A. Fletcher, "The Aims of University Teaching," David Layton (ed.), University Teaching in Transition (Edinburgh: Oliver and Boyd, 1968), p. 5.

[64] Ibid., pp. 5-8.

aspect of the program concerned specifically with educational technology.[65]

At this period of time, Charles F. Hoban extends a broadened scope of instructional technology. He defines instructional technology, in its modern usage, as the management of ideas, procedures, money, machines, and people in the instructional process.[66]

Because the concept of "technology" is generally associated with a mass medium, technological devices are alluded to as "aids" for mass education. This concept is erroneous and has retarded the full acceptance of the total technology of learning. The term "mass medium" as applied implies either wrong purposes or misconceptions of educational goals. Until the learning communcation assumptions that are carried by television to education are based with learning theory, their acceptance on the part of educators will be reluctant, grudging, and even impossible.[67]

Certain differences appear in the literature concerning basic terminology. Henry Lehmann writes: "The systems approach is nothing new. It is what we have called in the past 'the scientific method' and is a logical step-by-step approach to problem solving, even though we

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[65]Paul W. F. Witt (ed.), Technology and the Curriculum (New York: Teachers College Press, Columbia University, 1968), p. 64.

[66]Charles F. Hoban, "Man Ritual, The Establishment and Instructional Technology," Educational Technology, VIII (October 30, 1968), 6.

[67]Ryland W. Crary, Humanizing the School: Curriculum Development and Theory (New York: Alfred A. Knopf, 1969), p. 398.

perform many steps unconsciously."[68]

Leonard C. Silvern's definition differs from the one by Lehmann: "The systems approach is not common sense rigorously applied. Common sense can not be defined in precise and unambiguous terms. However, the author or speaker has the right to define the terms as he chooses. Systems approach applies to any area, can mean careful and detailed analysis, synthesis, modeling and simulation. . .or it can mean anything."[69]

In analyzing the "systems approach", Bela H. Banathy in a chapter entitled "Systems for Learning," in a 1968 book, Instructional Systems, listed the most conspicuous aspects:

> 1. An insistence upon a clear definition of the purpose of the system, and upon the formulation of performance expectations stated specifically enough to enable the construction of criterion measures that will reveal evidence of the degree to which expected performance has been attained.
>
> 2. The examination of the characteristics of the input.
>
> 3. The consideration of alternatives and the identification of what has to be done and how, by whom or by what, when and where, so as to ensure that the predetermined performance will be attained.
>
> 4. The implementation of the system and the testing of its output for the purposes of measuring the degree to which performance expectations are being met and assessing the efficiency of system operations.

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[68]Henry Lehmann, "The Systems Approach to Education." Audio-visual Instruction, XIII (February, 1968), 144-145.

[69]Leonard C. Silvern, "Systems Approach--What Is It?" Educational Technology, VIII (August 30, 1968), 6.

5. The identification and implementation of any adjustments needed in order to ensure the attainment of the purpose and optimize system output and system economy.[70]

Banathy states that the systems approach to instructional design and development offers a logical structure and the orderly use of strategies for making these curriculum decisions. The major system strategies may be translated for application to the design of learning systems:

1. The initial step is to formulate a statement that spells out what we expect the learner to do, know, and feel as a result of his learning experiences. (Formulate Objectives).

2. Develop a criterion test based on objectives and use it to test terminal proficiency (Develop Test).

3. Find out what has to be learned by the students so that he can behave in the way described by the objective specifications. In the course of this analysis, the input capabilities of the learner must also be assessed--he does not have to learn whatever he already knows (Analysis of Learning Task).

4. Consider alternatives and identify what has to be done to ensure that the learner will master the tasks (Functions Analysis). Determine who or what has the best potential to accomplish these functions (Component Analysis). Decide when and where the functions are to be carried out (Design of the System).

5. The designed system can now be tried out or tested, implemented, and installed. The performance of the learner, who is the product of the system, is to be evaluated in order to assess the degree to which he behaves in the way initially described (Implement and Test Output).

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[70]Bela H. Banathy, Instructional Systems (Palo Alto, California: Fearon Publishers, 1968), pp. 21-22.

6. Findings of the evaluation are then fed back into the system to see what change--if any--are needed to improve the system (Change to Improve).[71]

An over-all structure on the following page of the design of an instructional system flow chart places all elements into a perspective.

Writers are using the basic terms "technology" and "systems approach" but the essence and concept appear to have multiple referents.

Another report prepared by the Instructional Methods Program of the Center for Research and Evolution in Applications of Technology in Education (CREATE) has many implications for the design of improved curricula. This approach is described as laborious, time-consuming, and expensive; but could, if put into practice, result in potentially far improved educational efforts. Author Leslie J. Briggs concludes that it is simply a matter of the resources which are available to apply the total state of the art in implementing curriculum development.[72]

This monograph advocates that a new curriculum-project taskforce could be formulated to seek application of curriculum design practices which research advocates. A few of the key elements in this approach are:

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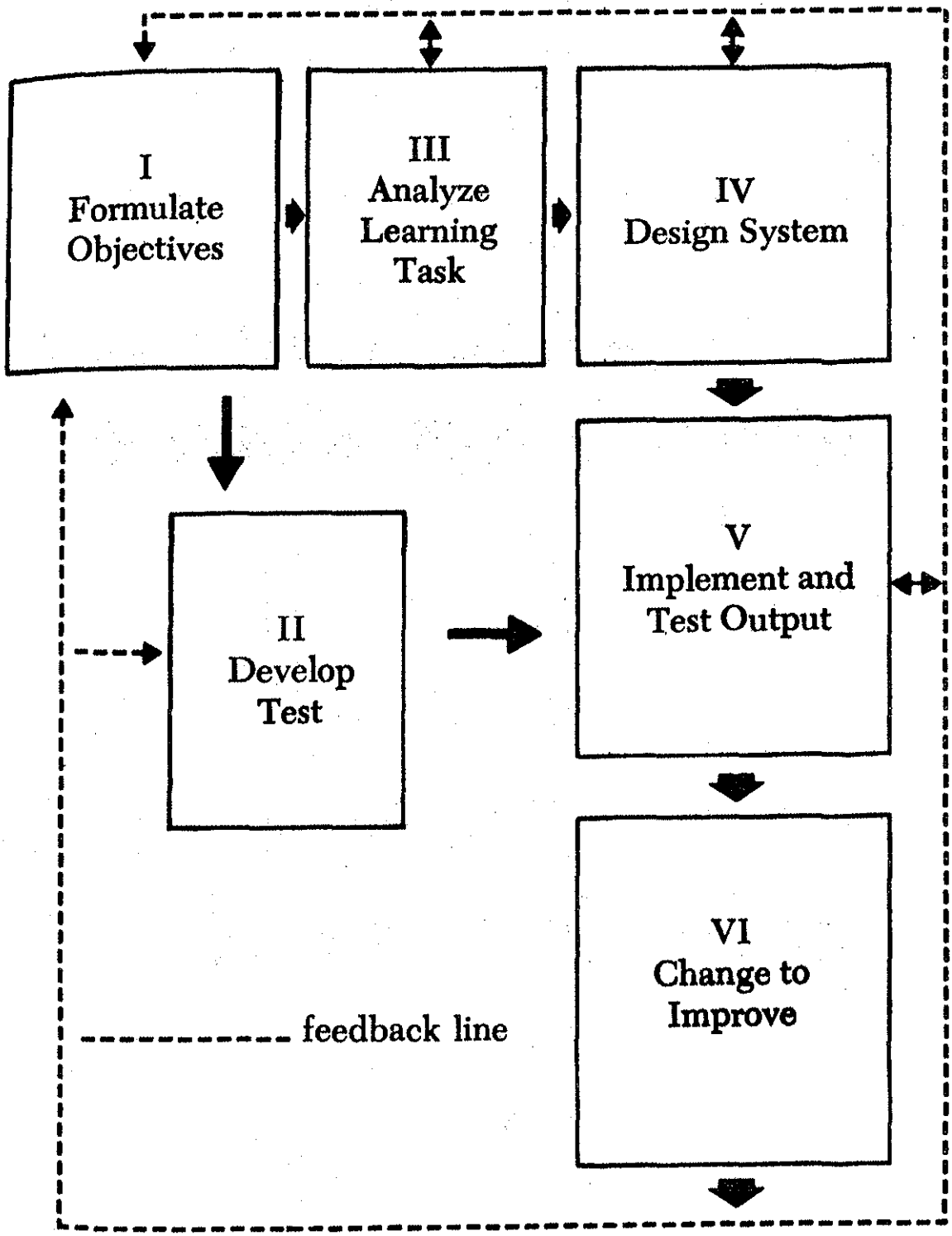
[71]Ibid. pp. 20-30.

[72]Leslie J. Briggs, Sequencing of Instruction in Relation to Hierarchies of Competence. A monograph prepared by the Instructional Methods Program of the Center for Research and Evolution in Application of Technology in Education. American Institutes for Research, 1968, p. 122.

Structural Design Instructional System



1. A performance-oriented view of curriculum design.[73]

2. Attention to the kinds of learning required.[74]

3. Attention to structure and sequence.[75]

4. Attention to selection of the instructional media.

5. Attention to more skillful programming techniques for media.[76]

6. Expansion of present empirical program-revision technique.[77]

7. Overall course evaluation, feedback, revision and re-evaluation.

During 1967-1968, F. Craig Johnson conducted a comprehensive study for the purpose of describing and analyzing the procedures that institutions of higher education accomplish with instructional research and development. Analyzed also were the impacts which these programs have on institutions and the implications which are applicable for higher education. The following institutions were visited: The Pennsylvania State University, The University of Michigan, University of Minnesota, University of Illinois, The Florida State University, Louisiana State

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[73]R. M. Gagne, Monographs on Curriculum Research and Evolution (Chicago: Rand-McNally, American Educational Research Association, 1967).

[74]R. M. Gagne, The Conditions of Learning (New York: Holt, Rinehart and Winston, 1965).

[75]Briggs, op. cit., p. 152.

[76]Briggs, Campeau, Gagne, and May, op. cit.

[77]D. G. Markle, The Development of the Bell System First Aid and Personal Safety Course: An Exercise in the Application of Empirical Methods to Instructional System Design (Palo Alto, California: American Institutes for Research, 1967).

University, The University of Texas, University of Arizona, University of California at Berkeley, University of Washington, University of Hawaii, Michigan State University, and State University of New York at Stony Brook. Sixteen different types of programs existed at these thirteen institutions. Two institutions had educational development programs to coordinate institutional improvement and curricular revision. Four institutions had offices of instructional resources for course development, learning, audiovisual, television, and testing. Three institutions had centers to concentrate on one aspect of educational development for the entire university. Seven institutions had projects with varied educational development functions. One-hundred-seventy-five administrators, faculty and students at the thirteen major colleges and universities were interviewed.[78]

At the outset of Johnson's study, seven assumptions were made about the management practices that would be followed by successful educational development programs. These assumptions and basic findings follow:

> 1. The directorate should be small. No program had more than one director and an assistant. Programs that included media, testing, curriculum development or learning services were line operations and not considered to be a functional part of the chief academic officer's staff. Where an individ-

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[78]F. Craig Johnson, An Evaluation of Educational Development Programs in Higher Education, a research performed pursuant to a grant with the Office of Education, U. S. Department of Health, Education and Welfare, Final Report, Project No. 7-E-114, Grant No. OEG-0-8-070114-1856 (010) (East Lansing: Michigan State University, March 1968), pp. 12-13.

ual director was given both line and staff responsibilities a clear distinction was made.

2. The director should be in a central position at the institutuion. All directors reported directly to the chief academic officer. Some directors held elected and/or appointed positions on key university committees, some were members of the central administration staff, others served on legislative committees as consultants but, to varying degrees, all had an opportunity to be aware of all-university problems.

3. Funds should be discretionary. All institutions have discretionary funds available to the chief academic officer. At seven institutions some of these funds have been made available to the faculty through the director and the program. At the remaining institutions, the directors could apply for additional funds on a contingency basis in competition with all other campus units. Most directors felt they have enough money to fund worthwhile and well thought-out projects.

4. A grant procedure ensures the best use of funds. Seven institutions had total funds of $278,719 and supported 140 projects during the 1966-1967 academic year. Of these, four had formal application procedures, five had deadlines, and four used a committee review procedure. All directors agreed that the grants had been a key stimulus for the development of new ideas. There were two different points of view on whether or not faculty should feel they were competing with each other for institutional funds--some felt it desirable, others did not.

5. Experts should be available to consult on development. Directors tend to agree on this, and most programs have identified experts who work with faculty. In discussing this with faculty, it was not always clear that they felt they had worked much with these experts. Many faculty felt they had done the work and solved problems by themselves. Often they were not aware that experts were available to help them if they needed it.

6. Coordination and evaluation of projects should be the continuing responsibility of the directorate. All directors agreed that evaluation was a vital function and admitted that it was the most difficult and, as yet, weakest part of their operations. This weakness has not gone unnoticed by the chief academic officer, deans, and faculty. Some programs have evaluation offices assigned to them but, with a few exceptions, the major work of these offices was scoring of examinations.

> Evaluation was most rigorous in formal research projects and least apparent in course improvement projects.
>
> 7. Faculty need to know that successful projects will have continued university support. Most faculty project directors were satisfied that it would continue. Support from their colleagues was not as easy to get. Many faculty members working on new ways of doing things were not being prevented from innovating--nor did they feel they were being rewarded or recognized by their peers. Some of this feeling may have stemmed from a higher faculty priority on research in the discipline, but this varied from department to department and institution to institution.[79]

Johnson concludes that educational development is going on in large colleges and universities and that these programs will continue to have administrative support. Impact of these programs is evident, but evaluation needs to be conducted to demonstrate the degree of output. Basic characteristics of these programs seem to apply from one institution to another; however, no two programs are organized exactly alike and individual differences within institutions must be carefully accounted when a program is established.[80]

L. C. Larson discussing the role of instructional design in college and universities, writes:

> Only a limited number of colleges and universities will be able to spend a million dollars in the design and development of a particular course. A number, however, are large enough to assemble instructional teams made up of selected teachers, subject matter specialist, curriculum specialists, and instructional design, development, and media specialists, to custom-design courses for an individual school system or

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[79]John E. Dietrich and F. Craig Johnson, "A Catalytic Agent for Innovation in Higher Education" Educational Record, XLVIII (Summer, 1967), 212.

[80]Johnson, op. cit., p. 23.

> university. In the case of higher education, approximately one-fourth of the colleges and universities with an enrollment of 2500 or more students educate three-fourths of the approximately 6,000,000 college-level students. It seems likely, therefore, that a number of universities, as well as government agencies, industries, and businesses, are large enough to undertake course development at the central administration level and will, therefore, need to employ design, development, and media specialists.[81]

In a program for systematic instructional improvement, Bucknell University has established criteria to give direction for instructional development and evaluation:

> The program should provide those conditions necessary for the personalization of instruction, for a wide range of learner abilities and interests. It should possess a systematic, self-improving dimension so as to avoid becoming as static as the program it replaced. It should minimize the difficulty involved for the professor to change or modify instructional objectives and content in order to make the instructional program relevant to changes in society and in the discipline itself. The program must be financially feasible for the University.[82]

The term "instructional design program" has been defined by the National Education Association's Department of Audiovisual Instruction in collaboration with the American Association for Higher Education in their publication New Media And College Teaching:

> *A systematic approach of the materials, equipment and other inter-related elements (including human components) of an assemblage that operates in an organized manner in handling the appropriate encoding of instructional messages and the distribution, use, and refinement of infor-*

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[81]L. C. Larson, "Developing a Graduate Program to Train Instructional Design and Media Specialists," Audiovisual Instruction, XIV (January, 1969), 20.

[82]J. William Moore, "A Program for Systematic Instructional Improvements." Audiovisual Instruction, XV (February, 1970), 28.

mation. To be effective, such a system must be sensitive to various stimuli and include elements for appropriate response, feedback, and adjustment.[83]

Brown and Thornton have synthesized major characteristics of an "instructional design program" which are identified in the review of literature section. For the National Education Association with affiliates DAVI and AHE, Brown and Thornton express criteria of an instructional design program for the entire curriculum of an institution of higher education. In its simplest form, the process of design programs involves eight procedural steps:

1. Develop clearly defined instructional objectives stated in operational, measurable terms.

2. Define efficient ways of carrying out these functions, giving specific regard to machines, materials and human capabilities and to their interaction in a design.

3. Determine functions related to the achievement of these objectives that may be performed adequately (or the most effectively and economically) by *(a) instruments alone* - (mechanical, electronic, tapes, and others); *(b) non-technical materials alone* - (books, programmed tests, syllabi, etc); or *(c) human beings* - (persons, instruments, or materials).

4. Distinguish the "human functions" most likely to be performed effectively by (a) one student working alone, as in a study carrel; (b) one or two students working with an instructor, as in a tutorial or dialogue; (c) small groups of students working with or without instructors; (d) instruction in medium-sized groups (20 to 60 members); (e) large group "in-person" instruction (up to several hundred persons taught simultaneously, for example in a large auditorium) or (f) instruction in "super-large" groups as in

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[83]James W. Brown and James W. Thornton, Jr. New Media And College Teaching (Washington, D.C.: The Department of Audiovisual Instruction in collaboration with the American Association for Higher Education, 1968), pp. 119-120.

the case of the televised course presentations that are distributed live to viewing groups in various parts of the campus.

5. Study the available professorial as well as nonprofessorial backup talent to discover persons with special capabilities and interest in performing the instructional tasks described.

6. Analyze the students to discover those who appear to be most capable of profiting from participation in the various alternative types of learning activities. (Some might prefer and be capable of handling independent study activities, for example, whereas others may flounder without more direct instructor guidance).

7. Determine the requirements of the instructional design, by survey of technical and nontechnical resources, physical facilities, support services, budgets and policies with a view toward improving or expanding them. The library, the media center, the listening laboratory, the independent study facility and other relative units are considered integral, not supplementary to a successful instructional design program.

8. Evaluate feedback data regularly, change and improve as called for with regard to originally stated objectives.[84]

Jerrold E. Kemp states that various systematic patterns for learning are emerging. Attention and planning must be given not only to subject content and student variables but also to many other factors that influence the success of the learning process. Integration of all these elements constitutes an instructional design. He places emphasis in the instructional design sequence of activities:

1. Set objectives in terms of the individual's needs in a changing society.

2. Select subject content to serve the objectives.

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[84]Brown and Thornton, op. cit.

3. Develop learning experiences in terms of the most efficient and effective instructional methods, keeping in mind the requirements and limitations of budget, personnel, facilities, equipment, and schedules.

4. Select and prepare instructional materials that fit the learning experiences and methods.

5. Test the materials with a sampling of learners.

6. Revise materials as necessary to satisfy the objectives.

7. Carry out the instruction.

8. Evaluate the results and revise elements in the design, as necessary, for future uses.[85]

This instruction design approach can be the starting level from which, eventually, a true instructional system may be developed. The concept of the instructional system is much broader than the instructional design approach and is beyond immediate application in most educational situations.

Kemp identifies three levels of "audiovisual" production which can be paralleled with the instructional design concept of learning. He lists the mechanical level, the creative level, and the design level. He maintains that materials which are carefully integrated into learning activities to serve specific instructional objectives may be part of a design for instruction.[86]

The term "instructional design" has become more common in the

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[85]Jerrold E. Kemp, Planning and Producing Audiovisual Materials, (San Francisco: Chandler Publishing Company, 1968), p. 8.

[86]Ibid.

literature at this period of time (1968). Models are emerging for systematic curriculum design. Each varies in detail, but in general, basic operations are involved. Eldon J. Ullmer identifies four distinct operational phases in the instructional design process:

1. The Function Definition and Analysis Phase.
2. The Instructional Strategy Formation Phase.
3. The Programming, Production and Testing Phase.
4. The Operation and Validation Phase.[87]

One may begin this approach by defining the objectives, analyzing the input and output of the system, determining ways of measuring these factors, and defining and describing all the relevant conditions affecting the system. Individualized instruction and instructional design programs both must involve the interaction of persons, procedures, and materials.

A differentiation has been made by John O. Bolvin between curriculum design, instructional design, and instruction:

> Curriculum design relates to the determination of the behavioral objectives selected on the basis of the philosophy of education and the structure of the subject matter under consideration. Instructional design is that portion of the educational system relating to factors that facilitate the learning of content, processes, etc., as specified in the statement of objectives. Elements of the instructional design would include diagnostic and evaluative instruments, materials, hardware, and environmental conditions necessary in assisting the learner to acquire the desired behaviors. Instruction is the total function of providing

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[87]Eldon J. Ullmer, "The Meaning of Instructional Technology; An Operational Analysis," Educational Technology, VIII (December 15, 1968), p. 12.

an integrated program of learning experiences for each student.

> Once the work of the curriculum design has established the scope and sequence of objectives, the tasks of instructional design begin. In the initial stages of development, the tasks to be considered are the development and specification of evaluation and diagnostic instruments, materials, and related instructional techniques.[88]

From a concept of the development of work design, Gerald Nadler extends several principles which can be derived and applied to the process of instructional design. Instructional design is function oriented; it is systematic; and it should employ the "ideal system" concept.[89]

Recent literature concerning the implications of the individualization of instruction contains ramifications for instructional design program development. The question has been asked about the curriculum director's role expectation in terms of the individualization of instruction. Applications of task analysis and systems analysis are a means of systematically approaching this role definition.

A recent trend is evident of heightened interaction among educators, behavioral scientists, educational publishers, electronics and computer industries, and research and development organizations in educational technology. Robert Glaser has recently hypothesized that the emergence of a unique occupational specialty called educational technol-

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[88]John O. Bolvin, "Implications of the Individualization of Instruction for Curriculum and Instructional Design," Audiovisual Instruction, XIII (March, 1968), 238.

[89]T. T. Raymond and P. A. Markstrom, "Work Design: The Function is What Counts" Production, LVII (1966), 130-133.

ogy or instructional design will emerge. This specialty could comprise a person or a team concerned with the production of educational procedures, materials, and systems. An appropriate scientific and technological base must be established for instructional practice. A study needs to be conducted of appropriate research and development activities from behavioral science knowledge. Behavioral scientists should become aware of the fundamental problems created by technological design efforts. A "science of instruction" or body of pedagogical principles then would be generated as a result of this interdisciplinary interaction. This science or body would then be fundamental to the task of instructional design.[90]

Glaser believes that the emerging "instructional designer" will probably have different sub-specialties, i.e.: applied research and development, operational materials design, computer systems, teacher practices, language and linguistics, pre-school learning, etc.[91]

Many writers in the field are using synonymously the terms "instructional systems approach," "instructional technology" and "instructional design." Some differences exist between "a physical science instructional technology" from "a technology of instruction supported by the behavioristic sciences."

Donald P. Ely expands the definition of "educational technology"

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[90]Robert Glaser, "Educational Technology as Instructional Design," Educational Technology, VIII (January 15, 1968), p. 5.

[91]Glaser, Ibid.

as adapted from the 1963 monograph, The Changing Role of the Audio-visual Process in Education: A Definition and Glossary of Related Terms:

> "Educational technology is that branch of educational theory and practice concerned primarily with the design and use of messages which control the learning process. It undertakes: (a) the study of the unique and relative strengths and weaknesses of both pictorial and nonrepresentational messages which may be employed in the learning process for any purpose; and (b) the structuring and systematizing of messages by men and instruments in an educational environment. These undertakings include the planning, production, selection, management, and utilization of both components and entire instructional systems. Its practical goal is the efficient utilization of every method and medium of communication which can contribute to the development of the learner's full potential.[92]

Ely identifies key words in this definition: "branch of educational theory and practice," "design and use," and "control." He relates that the basis of the term "educational technology" is derived from learning theory, communications theory, and systems engineering. Educational technology can be considered as a branch of the larger field of education. He explains that the "design and use" function integrate learning theory and practice, communication and systems analysis with definable behavioral objectives, media option consideration and implementation, teaching strategy, specification and establishment of evaluation procedures. The term "control" involves controversy with the "systems" concept. Ely emphasizes that this term implies manipulation of people

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[92]Donald P. Ely, "Educational Technology as Instructional Communication." Educational Technology, VIII (January 15, 1968), p. 7.

to some critics. He explains, however, that the implication maintains that learners will be guaranteed a minimum level of achievement by rigorously defining objectives and employing optimal media components in a systematic fashion. He concludes that learning goals can best be reached by the controls employed within the total system. If the term "facilitate" were substituted for "control," "educational technology," as a concept would be weakened with ambiguity.[93]

R. J. McBeath, recently acting director of the Instructional Resources Center, University of Hawaii and currently director of the San Jose State College Audio-Visual Service Center has developed an educational model. His thought expresses the evolution of educational practices in a three-step developmental approach. This model advocates a shift in the rationale of educational decision making. He explains that in the past a now outmoded rationale of thinking in dualistic terms or the "swinging pendulum" theory is being superseded. The proposed model reflects that growth in the direction of technology of instruction for the betterment of man and society requires interaction among culture, technology, educational systems, and change. He maintains that an increased amount of organization and control is required as society moves away from autocratic (stage I) and laissez faire (stage II) toward democratic control (stage III).[94]

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[93] Ibid.

[94] R. J. McBeath, "Is Education Becoming?" AV Communication Review, XVII (Spring, 1969), 36-40.

McBeath, reinforcing and enlarging upon Ely's[95] explanation of "control" writes:

> Through this type of increased control, responsible freedom (democracy, stage III) is more attainable. It is significant that it is this move toward independent study with its emphasis on readiness, involvement, and inquiry that is most likely to produce outcomes such as response mastery, adventure, and self-actualization. This concept of growth requires a greater understanding of the individual in society and a recognition of which outcomes an "educational system" has some control.[96]

This model hypothesizes that educational development must be designed with proper learning strategies, appropriate learning resources, and adequate feedback for evaluation. Technology of learning cannot be advanced by revolutionary measures, but rather through evolution, a time consuming process.

Samuel N. Postlethwait has implemented an audiovisual system which identifies as clearly as possible the responses, attitudes, concepts, ideas and manipulatory skills to be achieved by the learner. He has designed a multi-faceted, multi-sensory approach which will enable the learner to direct his own activity to attain botany course objectives. The term "study session" has been adopted to place emphasis on learning rather than teaching. Three basic study sessions plus other specially assigned activities are involved. They include independent study sessions, general assembly sessions, small assembly sessions, and

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[95]Ely, op. cit.

[96]McBeath, op. cit.

other activities. The independent study session is based on the premise that learning must be done by the learner himself and that all study activities should involve the learner as actively as possible. The entire approach to this study session is one of permitting the student maximum freedom and yet providing additional help at any time he requests it.[97]

David Engler explains that "instructional technology" is defined in two rather different ways. First and most commonly, it is defined as hardware--television, films, audio-tapes and discs, textbooks, etc. All of these instruments are implements and media of communication. Secondly, it is defined as a process by means of which educators apply the research findings of the behavioral sciences to the problem of instruction. He also defines this process as being value free. It can be utilized to achieve good or bad objectives. It can define objectives and measure achivement, but basically it is morally and philosophically neutral.[98]

Wesley C. Meierhenry, one of the first advocates of the importance of learning theory in the instructional design process states:

> A powerful conceptual device in the instructional design process to achieve specific behavioral objectives is the

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[97]Samuel N. Postlethwait, J. Novak and H. T. Murray, The Audio-Tutorial Approach To Learning Through Independent Study and Integrated Experiences (Minneapolis: Burgess Publishing Company, 1969), pp. 7-16.

[98]David Engler, "Instructional Technology and the Curriculum" Phi Delta Kappan, LI (March, 1970), 379.

> systems approach. The usefulness of a systems approach is that it calls attention to a multiplicity of factors and interrelationships which retard or expedite desired changes in behavior. . .A final step is to try out the materials, obtain feedback information, and to evaluate the success of the instructional design in terms of meeting predetermined objectives. When success has not been achieved, it is often difficult to isolate and to identify the factors which inhibit the desired learning. Communication models and/or systems analysis often prove helpful in identifying the weak elements and in suggesting means of improvement.[99]

Donald T. Tosti and John R. Ball propose a model for instructional system design. They maintain that a major fault in instructional design is the frequent failure to recognize the distinction between three separate design components: the medium, the presentation form, and the content. These authors express a solution to establishing such a distinction lies in taking a behavioral view. This model emphasizes the varied considerations in the selection of media which would implement an instructional design program task.[100]

Major dimensions of instructional design are identified by J. William Moore in an article entitled "Instructional Design: After Behavioral Objectives What?" He notes the importance of the statement of behavioral objectives in a form which can be reliably assessed. Classification, organization, and evaluation development will increase the probability that retention, learning-how-to-learn will occur. Develop-

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[99]Raymond V. Wiman and Wesley C. Meierhenry, Educational Media: Theory Into Practice (Columbus, Ohio: Charles E. Merrill Publishing Company, 1969), pp. 274-275.

[100]Donald T. Tosti and John R. Ball, "A Behavioral Approach to Instructional Design and Media Selection." AV Communication Review, XVII (Spring, 1969), 5-25.

ment of observational procedures which will increase the probability that productive instruction can be implemented and evaluated is important for all instructional procedures to be reviewed and modified accordingly.[101] This criterion emphasizes an important rationale for the systematic instructional design program concept.

Faculty of the Indiana University Division of Educational Media and the Audiovisual Center recently completely reevaluated all of their programs and courses. Three committees were organized: (1) materials and administration, (2) production, and (3) research and theory. Reports reviewed by all committee members combined activities and future personnel needs of the publishing/electronic, military, government, business, industry and adult organizations.[102] A major emphasis was placed upon the application of a systems approach to instructional design, development, and deployment of media, as initiated by Carpenter,[103] Finn,[104] Gagne,[105] Hoban,[106] Glaser,[107] and Heinich.[108]

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[101] J. William Moore, "Instructional Design: After Behavioral Objectives What?" Educational Technology, IX (September, 1969), 45-47.

[102] Larson, loc. cit.

[103] Carpenter, loc. cit.

[104] Finn, loc. cit.

[105] Gagne, loc. cit.

[106] Hoban, loc. cit.

[107] Glaser, loc. cit.

[108] Heinich, loc. cit.

Title VII of the National Defense Educational Act has sponsored a ten-year experiment in educational technology. This federal involvement has demonstrated the feasibility of large-scale educational systems and that they can extend instruction to all while permitting the individualization of instruction without significant increase in cost. During this past decade, implementation of the new technology has been slow because of the cost factor, loss of local autonomy in accepting regional systems and unwillingness to invest in an unproven instructional system. Solutions for this dilemma include the production of quality materials for presentation, larger cost accounting unit implementation, and unified, integrated, systematic approach for education. This reference stresses the need for development projects to organize research projects and research findings into effective systems.[109]

Several federally sponsored studies of the procedures and cost analysis of media in instructional system development have been conducted. John Barson[110] and Gardner M. Jones[111] have developed a

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[109]Andrew R. Molnar, Educational Technology, The White Elephant, Document ED 027755, U.S. Office of Education (Washington, D.C.: Government Printing Office, 1969).

[110]John Barson, A Procedural and Cost Analysis Study of Media in Instructional Systems Development: Part A, U.S. Office of Education Grant No. OE-3-16-030 (East Lansing: Michigan State University, 1965).

[111]Gardner M. Jones, A Procedural and Cost Analysis Study of Media in Instructional Systems Development: Part B--Instructional Cost Analysis, U.S. Office of Education Grant No. OE-3-16-030 (East Lansing: Michigan State University, 1965).

comprehensive study in two parts which analyzes these procedures and cost factors.

Michael G. Sovereign has also recently developed similar studies with recommendations for media utilization, application of new technology, and educational systems organization. The purposes of these studies are to provide guidelines for realistic estimation of total system costs and to provide a data base for further studies relating to the selection, implementation, and operation of various instructional media systems.[112]

The Age of Discontinuity written by Peter F. Drucker, authority in the field of management, discusses educational, social, and political conflict in society. He states that learning and teaching will be greatly affected by the learner's ability to gain immediate access to more relevant information. He believes education to be far behind medicine and other professions. He says, "The knowledge industry, like the other emerging industries, is based on a new perception: the systems concept. The systems concept will require that all components be integral parts of the system. As instructional technologists, werneed to become involved with, and concerned about, the impact of our "information handling technologies" on our culture and on our economic structure.[113]

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[112]Michael G. Sovereign, Costs of Education Media Systems, U.S. Office of Education Contract No. OEC-1070079006-5139 (Stanford: General Learning Corporation, 1969).

[113]Peter F. Drucker, The Age of Discontinuity (New York: Harper and Row, 1968).

As this review of literature indicates, many varied systems approach models are available. A. Maughan Lee, Instructional Systems Consultant, Brigham Young University, relates that there may be more than one system or approach which will meet a program's requirements. An institution must decide what purposes a system will serve, and then select, adapt or produce a system which will best satisfy its rationale. Consideration for time and cost factors must be made.[114]

Paul Saettler elaborates upon the present state of instructional technology as a general systems approach:

> I have presented a general, long-range proposal for the training of instructional technologists in full recognition that at present such an ambitious program is handicapped by a lack of adequate personnel and financial resources. Therefore, as has been suggested, I propose that the federal government sponsor such developmental training programs for instructional technology, starting with those easily identified institutions that have already provided leadership in this area and those qualified institutions now actively initiating such programs. Since such programs would best succeed in a Research and Design Center context, the value of establishing new Research and Design Centers at institutions undertaking developmental training in instructional technology is evident. But the long-range goals seem clear: instructional technology must be transformed into an applied science. To do so, it will need a large number of developmental instructional technologists who value and use applied behavioral science and who can create the patterns and combinations of media and materials required to solve problems of learning and motivation. Unless some basic conceptual, methodological, and political changes occur within the foreseeable future, the glowing expectations for instructional technology held by many may lead to progressive disillusionment and

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[114] A. Maughan Lee, "Instructional Systems: Which One?" Audiovisual Instruction, XV (Janaury, 1970), 31.

confusion.[115]

Gabriel D. Ofiesh emphasizes as educational technology matures, it supports, through the design of learning environment, the growth of a science of education. He compares instructional technology to education with Bessemer to the steel manufacturing process and Henry Ford to automobile development. As others have written, technology encourages further educational research, development and design. Ofiesh also advocates a study of the engineering of completed educational material and their possible implementation and wide dissemination. He stressed that efforts are needed to produce educational systems with a high degree of reliability composed on integrated materials and elements adaptive to the learning requirements of individual students.[116]

On March 3, 1970, President Richard Nixon delivered to the Congress of the United States his Message on Educational Reform. In the recent message, the President compares national priorities. As a nation, we currently (1970) spend less than one half of one per cent of America's educational budget on research, compared with five per cent on the health budget and ten per cent for defense. At present nationally, education is financed by the states for 38 per cent, by the federal government for eight per cent, and by local

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[115] P. Saettler, Instructional Technology: A General Systems Approach (New York: Appleton-Century-Crofts, 1970).

[116] Gabriel D. Ofiesh, "Educational Technology for a Science of Education," Educational Technology, X (January, 1970), 11.

revenue for 54 per cent. Of these local revenues, almost all comes from property taxes, but this source is not keeping pace with the needs of educational expenditures. A major review of educational finance bases and educational needs as related to technology is in order.[117]

He emphasizes the instructional design program need with this statement: "We must stop pretending that we understand the mystery of the learning process, or that we are significantly applying science and technology to the techniques of teaching."[118]

On March 12, 1970, Sterling M. McMurrin, Chairman of the Commission on Instructional Technology delivered a Statement to the Committee on Education and Labor, House of Representatives. This statement reports that universities are, only to a limited extent, implementing instructional technology. The use of technological resources and instruments (television, films, computers, or programmed texts) has been implemented creatively in a sustaining manner at a few institutions. After an initial burst of enthusiasm for instructional technology, many institutions have quickly lost interest. This Commission Statement compares the impact of technology on American education in 1969 with that of the Model T Ford on the automobile in American life in the 20's:

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[117]Richard M. Nixon, Message on Educational Reform, Delivered to the Congress of the United States (Washington, D.C.: Government Printing Office, March 3, 1970), p. 9.

[118]Ibid., p. 1.

> The further ahead one looks, the more benefits technology seems to hold out for education. Instructional technology could extend the scope and power of instruction.
>
> Our study has shown that one-shot injections of a single technological medium are ineffective. At best they offer only optional "enrichment." Technology can carry out its full potential for education only insofar as educators embrace instructional technology as a system and integrate a range of human and non-human resources into the total educational process.[119]

With the rationale that technology can make education more productive, individual, and powerful, learning then will become more immediate and accessible giving instruction a scientific base and making accessibility to education more equal, the Commission concludes that the nation should increase its investment in instructional technology. By upgrading the quality of education, the quality of individuals' lives and of society generally would be upgraded.[120]

Edgar Dale writes that if a serious desire prevails for curriculum improvement for this societal upgrading, critical guidelines must be followed. He stresses the need for an overall development--a statement of central values. These values may center on thinking, creativity and self-renewal. A dynamic learning setting has self-directed, self-disciplined learners who are making daily progress toward

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[119]Sterling M. McMurrin, Statement to the Select Education Sub-Committee of the Committee on Education and Labor, House of Representatives, A report developed by a nine-member Commission on Instructional Technology, Department of Health, Education, and Welfare (Washington, D.C.: Government Printing Office, 1970), p. 10.

[120]Ibid.

goals which they personally accept. Each learner must be respected and carefully nurtured.[121]

President Nixon emphasizes our national education priority in his March, 1970, Message to Congress:

> Nearly a century ago, Benjamin Disraeli advised Parliament that upon the education of the people of this country, the fate of this country depends! That is no less true in the United States today, where nearly one person out of three is studying or teaching in one of our schools or colleges and where the greatest social controversy of our generation has centered.[122]

Paralleling an instructional design program rationale, President Nixon proposes to the Congress establishment of a National Institute of Education. This proposed Institute, as a focus for educational research and experimentation, could become an important element in the nation's educational system. This agency would administer an annual expenditure of as much as a quarter of a billion dollars.[123]

Curriculum development in institutions of higher education can define the over arching set of values and determined goals and methods of approach to be utilized. Development should be concerned with the appropriations (human and financial) and ends of education.

Instructional design programs in these institutions coordinate

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[121] Edgar Dale, "The Materials of Instruction," The News Letter (Columbus, Ohio: College of Education, The Ohio State University, Vol. 35, March, 1970), p. 4.

[122] Nixon, op. cit., p. 13.

[123] Ibid., p. 2.

and integrate men with technological devices (instruments and resources) in a learning environment. Planning, production, selection, management, and utilization of both components can comprise the entire instructional system. Instructional design has the practical goal to efficiently utilize every method and medium of communication which contributes to the development of the learner's full potential.

CHAPTER III

PROGRAM SELECTION CRITERIA

In an attempt to identify and to locate instructional design programs fully implemented or actively planned at selected universities, a questionnaire was designed partially paralleling the National Education Association's DAVI and AHE published criteria of eight programmed procedural steps. The purpose of the questionnaire was to probe the scope and nature of the actively planned or fully implemented instructional improvement or development programs. Specifically, this written survey was designed to determine the interaction of the following academic development elements: curricula goals and objective technical encoding; learning strategy designing; learning resource implementation designing, production and dissemination services; program feedback evaluating; and total institutional long-range academic planning and proposal funding.

Questionnaires were mailed to chief academic officers at 48 selected universities. Eighty-eight (forty-three universities) per cent of the institutions have returned written responses. In analysis of the scope and nature of the 43 responding selected university academic support programs, this writer has identified 23.8 per cent (10 universities) with implemented, systematically structured programs. Another 16.7 per cent (seven universities) have proposed systematic conceptualized plans which are presently in the acceptance stages. A total of 59.5 per cent (25 universities) have not advanced a systematically conceptualized means

for the improvement or development of instruction. Statistically, 40.5 per cent (17 universities) have implemented or are actively engaged in initiating a systematically structured means of increasing and improving their university learning (academic) priority. (For a listing of all surveyed institutions with their instructional design or improvement scope rating, see Appendix A.) A large percentage of these responding administrators have sent additional program information in the form of program documents, memoranda to faculty, or other publications.

Using the criteria of completeness of instructional design concept, geographic program distribution, and time and travel considerations, six institutions were visited. Case studies have been developed in this chapter to describe the scope and nature of selected instructional development and improvement agencies. The six selected institutions are:

	Enrollments[1]	
Michigan State University	44,421	Program fully implemented.
Penn State University	34,525	Program fully implemented.
University of Washington	31,913	Program proposed.
University of California at Los Angeles	28,288	Program only partially proposed.
University of California at Berkeley	28,132	Program partially implemented.
Florida State University	16,303	Program fully implemented.

[1] Opening Fall Enrollments-Higher Education, 1968, No. FS 5.253; 54003-68 Part B (Washington, D.C.: U.S. Office of Education, Department of Health, Education and Welfare, 1969).

These descriptive case studies by no means include all of the exemplary instructional design programs which have been implemented at the 43 surveyed institutions. In consideration of the selection criteria, this chapter will, hopefully, describe the background and present status of instructional design programs at the six selected universities.

Personal interviews of varied lengths were conducted with 94 individuals at the six selected institutions. (For a listing of university administrators and program personnel who were interviewed, see Appendix B.) Students, faculty members, program coordinators and supervisors, program administrators, campus planning directors, academic vice presidents, and executive chief administrators were interviewed.

The total group interviewed included the following categories:

Presidents	2
Academic vice presidents	8
Campus planning directors	2
Faculty members	22
Students	18
Program directors	5
Program associate directors	5
Program supervisors	32

If the following six case study reports fail to meet an objective of this study, the fault lies with this writer and not with the persons interviewed. All individuals were cooperative, generous with their busy scheduled time, and direct with answers.

Case Studies
Michigan State University

Program Title, Purposes and Priorities: Instructional Development Services, an extension of the Educational Development Program, coordinates campus expertise in applied human learning, instructional media and resources, and evaluation. Rationale for this service and coordination was generated by a Learning Resources Advisory Panel 1962 report statement: "One purpose of the University is to promote learning. In this period of expansion, the quality of learning can be not only maintained but heightened by deliberately focusing upon learning objectives and by efficient and informed use of the various resources which can accomplish these objectives. Every effort should be made to discover and employ the conditions which must be present for learning to result."[2]

In 1964 the Instructional Development Service was coordinated and three sections were identified: 1) the Learning Service, 2) the Instructional Media Center, and 3) Evaluation Services. See following page for Instructional Development Services Organizational flow chart. Coordination of the three service agencies provides colleges, departments, and instructors with an integral, systematic approach for the improvement of instruction. Initiation of this Instructional Development Service to Coordinate Services was motivated largely by a Ford

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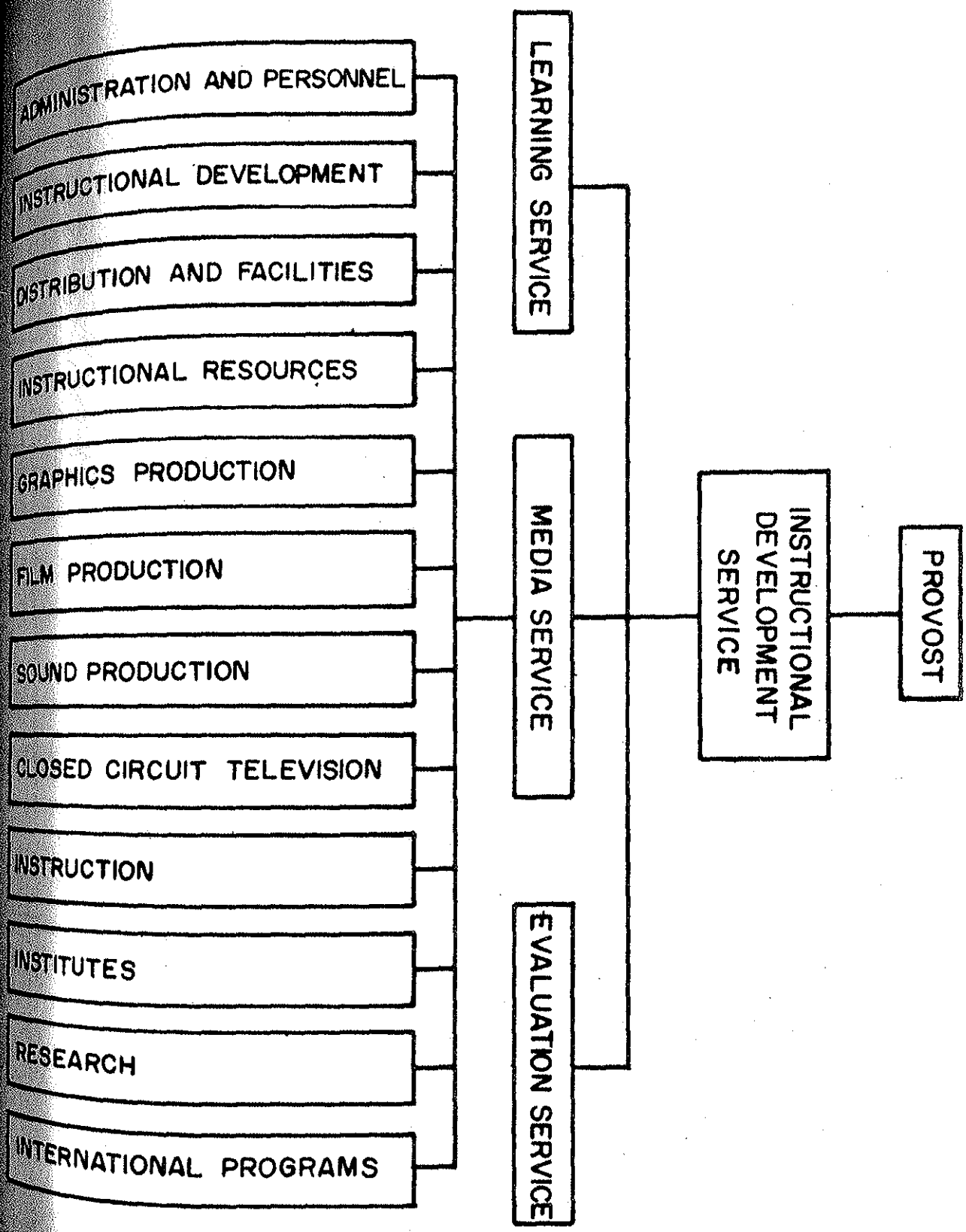
[2]Learning Resources Advisory Panel "Report of Learning Resources Advisory Panel" (East Lansing: University of Michigan, 1962), p. 2. (Mimeographed.)


PROVOST
INSTRUCTIONAL DEVELOPMENT SERVICE
LEARNING SERVICE
MEDIA SERVICE
EVALUATION SERVICE
ADMINISTRATION AND PERSONNEL
INSTRUCTIONAL DEVELOPMENT
DISTRIBUTION AND FACILITIES
INSTRUCTIONAL RESOURCES
GRAPHICS PRODUCTION
FILM PRODUCTION
SOUND PRODUCTION
CLOSED CIRCUIT TELEVISION
INSTRUCTION
INSTITUTES
RESEARCH
INTERNATIONAL PROGRAMS

Foundation grant which was approved July, 1964. This $440,000 grant was designated for a three year period to study the curriculum, the learning-teaching process and the utilization of faculty, financial and physical resources.

Purposes of Instructional Development may be identified by summarizing services of each of the three program extensions: Learning Service, Instructional Media Center, and Evaluation Services.

The Learning Service consults with departments or faculty members for increasing the efficiency of student learning. Current research and other knowledge regarding variables which influence the learning process (i.e., motivational factors, individual differences in learning styles, student attitudes and values) are applied to academic problems. Learning Service personnel assist in the design of instructional procedures that make use of all appropriate technology and relevant techniques. The Learning Service also assists with an Educational Development Program objective by identifying critical areas where innovations may produce the greatest extent of instructional improvement. Personnel assist in the development, implementation, and testing of instructional innovations and ideas.

When colleges, departments or faculty request assistance, the Learning Service conducts inservice workshops in learning-oriented areas (i.e., applied learning theory, simulation and gaming, multi-media instructional system design, and programmed instruction). An experimental classroom laboratory is maintained by the Learning Services. This facility provides space and instruments for studying student learning behavior

in relation with instructional practices. This laboratory is available for faculty research or development projects.

Presently, the Learning Services Director also serves in the capacity of Associate Director of the Educational Development Program.

The Learning Service works closely with a wide range of departments in the development of Structured Learning and Training Environments (SLATEs). SLATEs are classroom facilities where students pursue structured lessons on their own time and at their own pace. They engage multi-media, employ programmed materials, and include laboratory equipment or displays which are appropriate.

The Instructional Media Center is responsible for the planning, coordination, and development of instructional applications of all new educational media, including closed circuit television, and the improvement through research and development of the programs and materials designed for instructional purposes. The Center works integrally with the Learning Service in instructional analysis and planning. Liaison and service relations are maintained with language laboratories and other learning-oriented units on campus. Audio, projection, and closed circuit television services are provided for regularly scheduled undergraduate and graduate courses on campus.

In cooperation with the Learning Service, specialists of the Instructional Media Center advise University faculty in their analysis of media needs as related to the application and to the procurement or production of materials pertinent to instructional design. Instructional Media Service Units have been expanded to meet increasing demands for the

production and distribution of instructional films, graphics, audio-tape recording, public address and related instructional equipment.

In addition to the provision of equipment distribution, the Center maintains a complete Equipment Repair and Maintenance Service Unit. (See following pages for 1) organizational flow chart of Graphics Unit Services and 2) Instructional Resource Services Distribution Chart with Instructional Resource Center Satelites.)

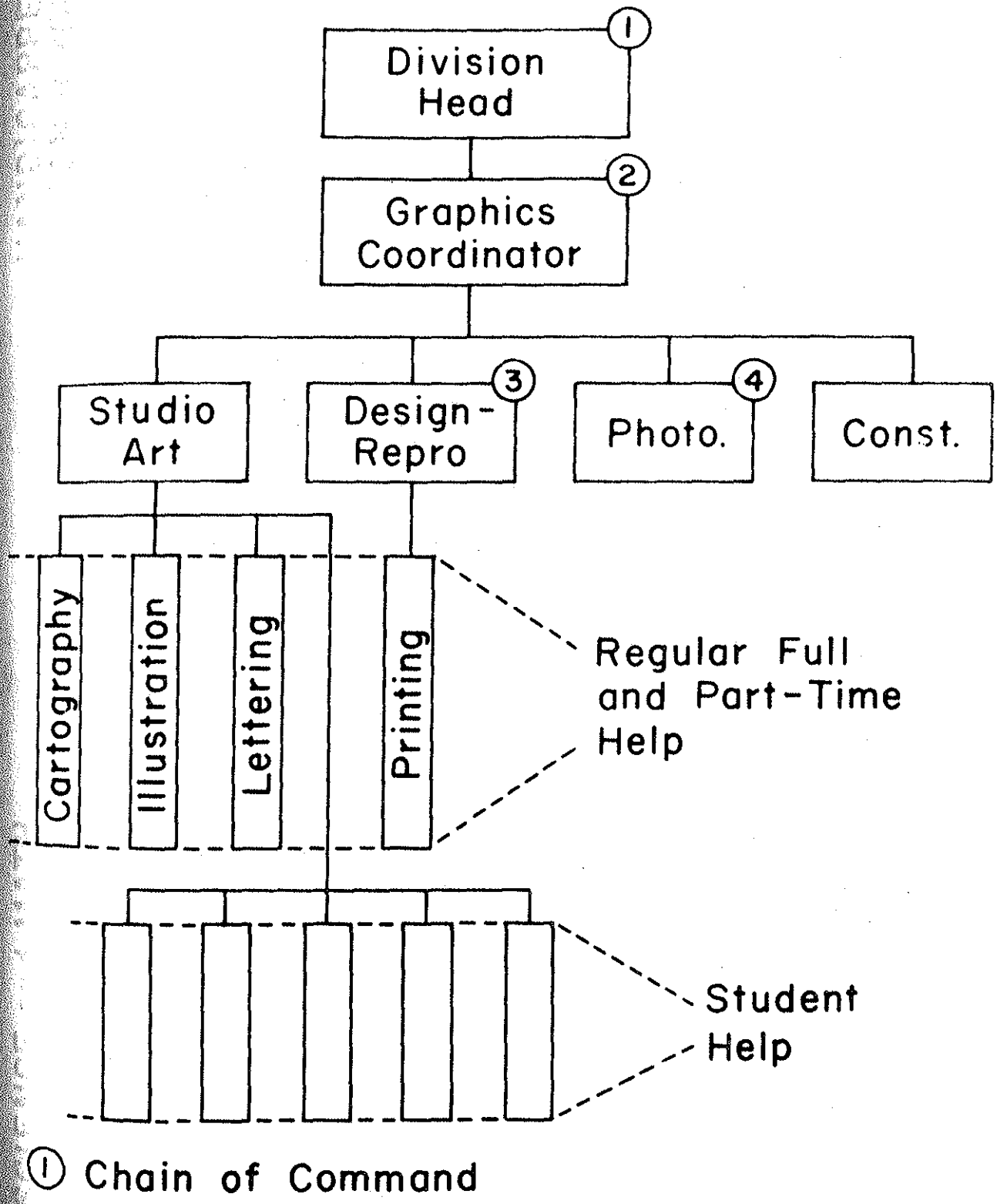
The third integral section of the Instructional Development Services is the Evaluation Services. Personnel cooperate with academic departments in the evaluation of student performance and the development of well-constructed examinations. Capabilities in test construction, evaluation, production, and security are integral functions of the Instructional Development Services.

Concerning academic program priorities at Michigan State University, major responsibility for curricula goals are established by the Board of Trustees, the colleges, the individual departments, or various committees of the University.

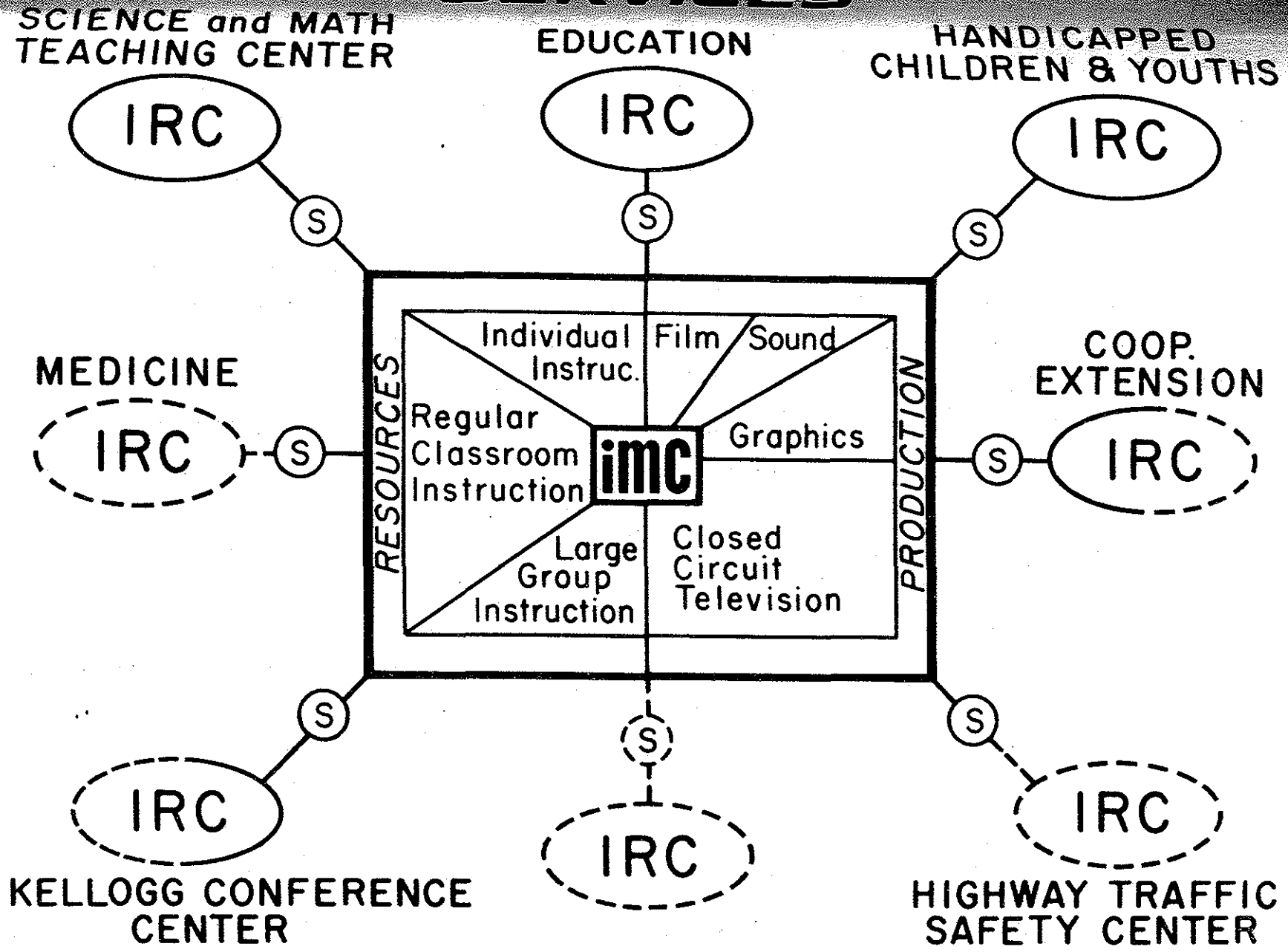
The Educational Development Program has made possible the procedure of scheduling a coordinated means (Instructional Development Services) for faculty member-learning specialist interaction for the purpose of designing instructional systems. A statement of MSU's Educational Development Program purpose was released when the Program began in 1964, and currently the goal remains intact:

> The Educational Development Program will be devoted to the development and implementation of a set of educational principles and procedures at Michigan State University which

ORGANIZATION
GRAPHIC PRESENTATION DIVISION



① Chain of Command


SERVICES
SCIENCE and MATH TEACHING CENTER
EDUCATION
HANDICAPPED CHILDREN & YOUTHS
IRC
IRC
IRC
S
S
S
MEDICINE
IRC
S
RESOURCES
Individual Instruc.
Film
Sound
Regular Classroom Instruction
imc
Graphics
Large Group Instruction
Closed Circuit Television
PRODUCTION
COOP. EXTENSION
S
IRC
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IRC
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IRC
KELLOGG CONFERENCE CENTER
HIGHWAY TRAFFIC SAFETY CENTER

will be developed and approved by the general faculty and which will preserve and improve undergraduate education in the face of increasing enrollments, potentially limited financial resources, a growing shortage of faculty personnel and an explosive increase in the amount and complexity of knowledge.[3]

The purposes of the Educational Development Program are:

1. To identify major problems in the areas of the curriculum, the learning-teaching process and the utilization of faculty, financial and physical resources.

2. To stimulate and conduct research which will suggest solutions to identified problems.

3. To undertake projects and studies which give promise of improving both the quality and the efficiency of the undergraduate program.

4. To support and provide service to groups interested in experimentation with new procedures and methods in learning and teaching. (Instructional Development Services.) See following page for the Instructional Development Services Scope.

5. To facilitate implementation of faculty and administration-approved solutions to problems.

6. To identify and communicate progress in research, experimentation and implementation.[4]

Basically the responsibility for analyzing student learning capabilities are clearly diffused throughout the University. Primarily, this responsibility rests with individual faculty members who teach the courses. Learning Services of the Instructional Development Service

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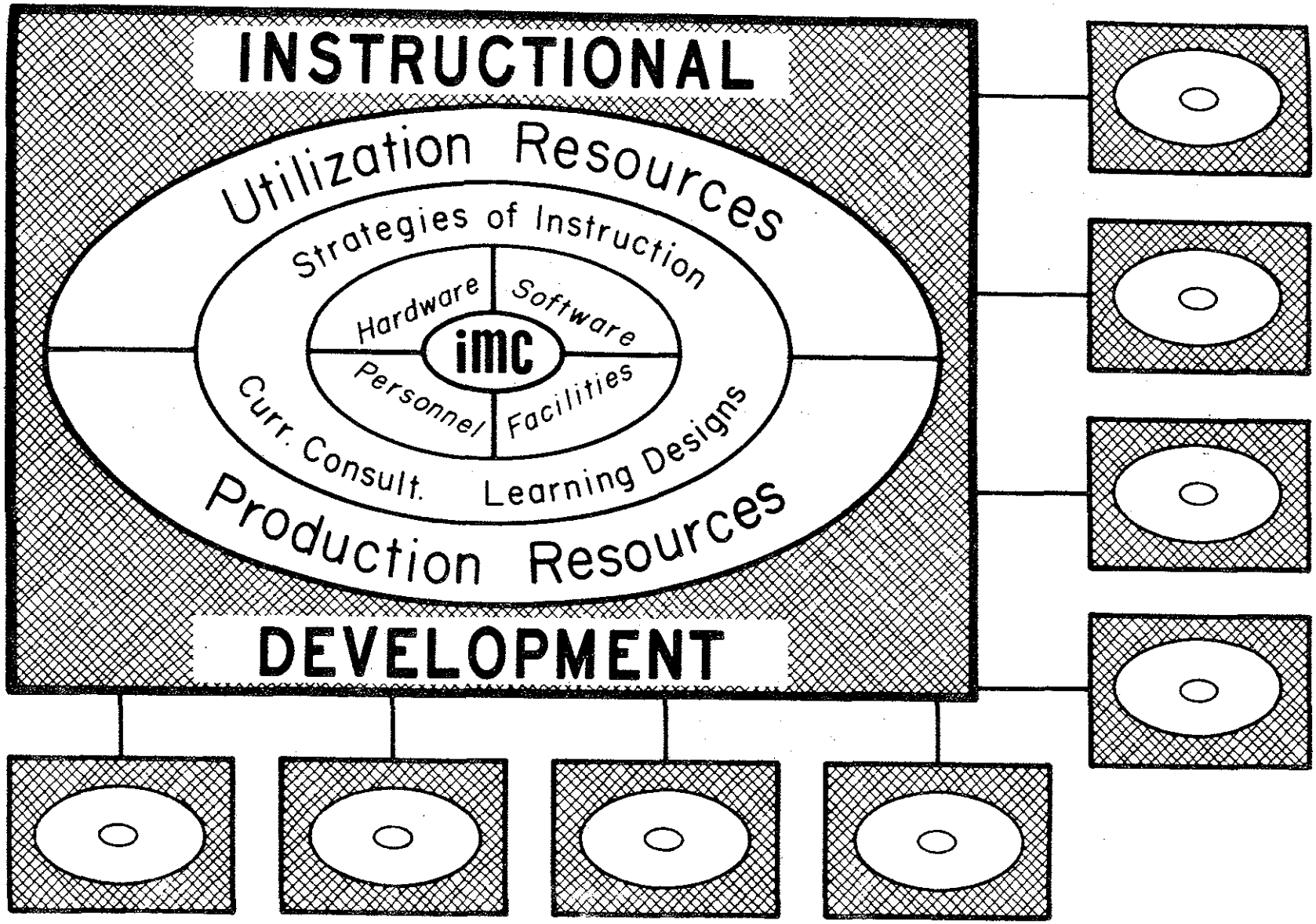
[3]Educational Development Program Report, "The Educational Development Program" No. 1 (East Lansing: Michigan State University, October 20, 1964), p. 7.

[4]Ibid.

INSTRUCTIONAL RESOURCES



assists in defining and planning efficient instructional strategies. Complete services are available with respect to learning system design and evaluation. All media services are available and administered centrally within Instructional Development Services Scope. Charges are assessed for graphic and photography processes, but sound, projection and television services are provided without cost for regularly scheduled undergraduate and graduate classes on campus. No systematic, formalized procedure was in evidence for specifically evaluating all aspects of the Instructional Development Services system.

The Educational Development Program works at the levels of University policy formulation, college and department operation, and individual student learning. Simultaneously, it works with curriculum, instruction and learning resources at each level. Progress in MSU's educational development is almost totally dependent upon University faculty concern for academic improvement.

The following ten Michigan State University Educational Development Program priorities have provided a bases criteria for a series of recent studies:

> 1. *Establish a small directorate.* An educational development program exists to stimulate, facilitate and communicate. There is no need for it to become an empire. A small directorate of one or two people will be sufficient to coordinate the largest program.
>
> 2. *Provide an overview of academic problems.* The best overview is found in central academic administration. Sooner or later almost all problems land on the desk of the Provost or Dean of Faculties. The director of the program should have regular contact with the chief academic officer.

3. *Give access to key faculty committees.* Many of the problems the program will be asked to help solve will arise in faculty policy and curriculum committees. Not only must the director understand the faculty point of view, but perhaps more important, the faculty must have confidence that the director understands their point of view. Furthermore, these groups will frequently be part of the channel through which solutions must flow.

4. *Coordinate existing expertise.* Often the testing, media, and learning experts and even the institutional research experts on the campus are working unilaterally to develop their own facilities. In some instances, they may be consciously or unconsciously competing with or at least duplicating each other. They may even be unaware of the institutional problems which require their special skill. Coordination of these experts can provide solutions to important university problems. If additional expertise is necessary, it should be placed in these groups rather than expanding the directorate.

5. *Provide discretionary funds.* Many times, a small amount of money can help solve very large and real problems if the money can be committed quickly. Other items, large and costly projects can be given "seed" money until external support can be found. A principal obstacle to innovation is the shortage of faculty time. By the provision of released time, faculty members can be freed to work intensively on new ideas. Further, discretionary funds can be used to encourage action-oriented research on immediate problems. Thus, discretionary funds make possible the mounting of immediate faculty action.

6. *Build a grant procedure within the university.* A project base gives the chance to select the activities which most need support. A simple proposal, review, approval monitoring and reporting function should be established. Faculty members should spend only a minimum time on this procedure and devote a maximum effort to the project itself.

7. *Encourage faculty to submit proposals.* Most problems can be solved only by the faculty most directly concerned. The small directorate neither can nor should take an active part in projects.

8. *Provide continuing liaison with projects.* Projects should not be funded and forgotten. Continuous liaison should be supplied from inception to completion. In some instances when departments or colleges have several on-going projects,

faculty members may be appointed to serve this liaison function.

9. *Build in evaluation.* Experiments tend to become perpetuated in the system--sometimes regardless of their worth. Failing experiments must be eliminated. Evaluation should be a part of each project. Often the faculty involved is best able to do the evaluation, while at other times, evaluation by an external agency may be desirable.

10. *Establish regular university support for successful projects.* All projects should be reviewed. Those judged to be successful should be continued in the regular university operation and supported from regular university funds.[5]

Administrative Structure of the Program with Relationship to the University's Chief Academic Officer: The Educational Development Program is the Division of the Provost's Office responsible to the faculty and the administration in the continuing work toward improvement of the educational opportunities provided for students. This Program has a University provost as its director with a direct liaison with the University President's office. See following page for Educational Development Program Administrative Organizational flow chart.

The Educational Development Program functions on a project base in much the same manner as other funding agencies. Proposals are submitted by members, groups, or committees of the faculty, and by departments, colleges, and the administration. All projects must have the approval of the appropriate department chairman and college deans. Project proposals are kept simple. If questions arise, suitable faculty

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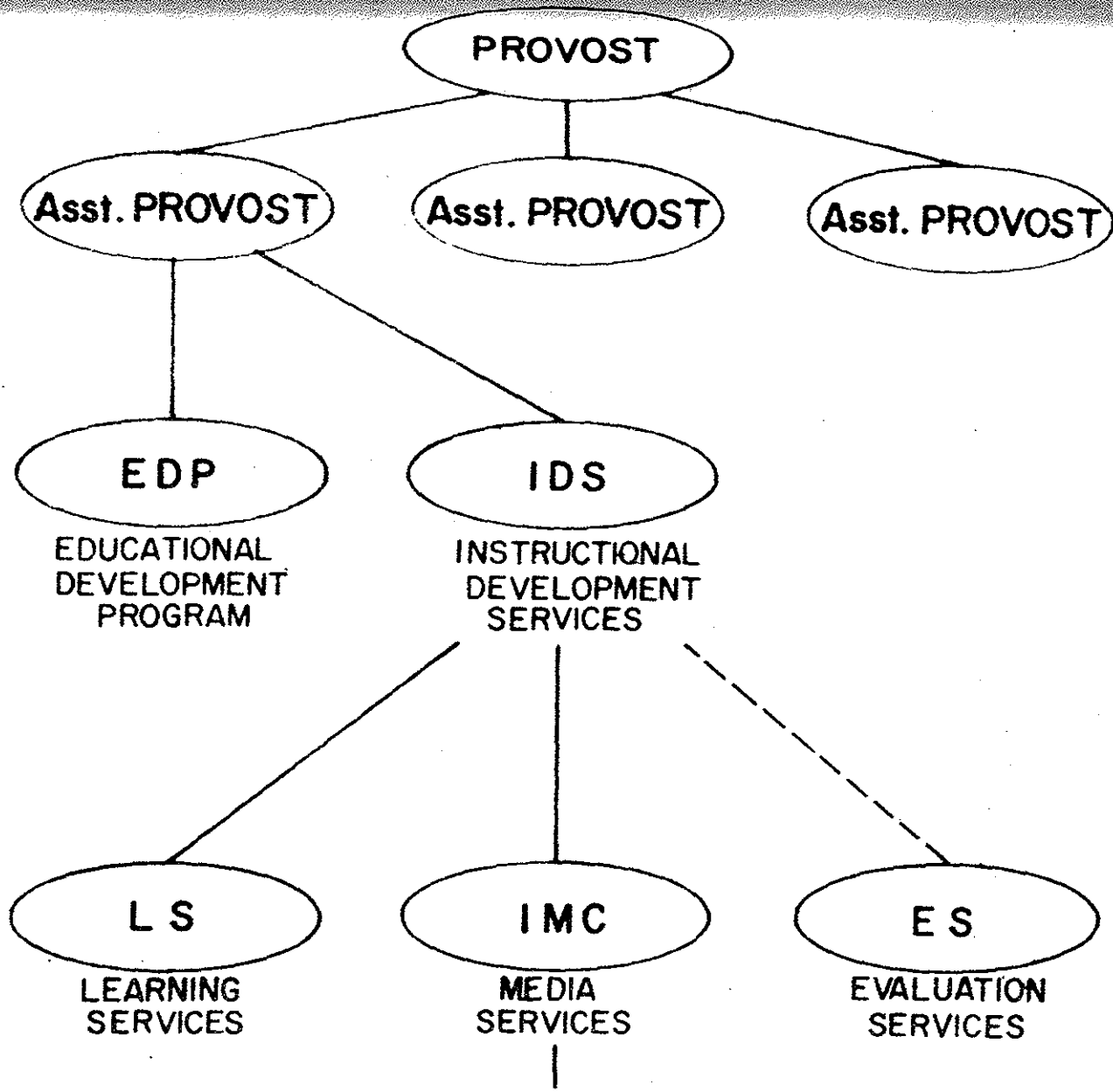
[5]John E. Dietrich and F. Craig Johnson, "A Catalytic Agent for Innovation in Higher Education," Educational Record, XLVIII (Summer, 1967), 212.


PROVOST
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EDP
EDUCATIONAL DEVELOPMENT PROGRAM
IDS
INSTRUCTIONAL DEVELOPMENT SERVICES
L S
LEARNING SERVICES
I M C
MEDIA SERVICES
E S
EVALUATION SERVICES

experts discuss the proposal with the submitting group. Other faculty specialists screen the proposal and make recommendations concerning its feasibility. Typically, a well thought-out proposal can be processed from initial discussion to granting in a period of less than two weeks.

Four general criteria have been established against which all projects are measured. These are, first, the number of students affected. In general, EDP is concerned with those courses and departments which have large student enrollments. Secondly, the evidence of an experimental approach to curriculum or instruction is considered. Proposals which merely amplify traditional procedures are referred to the departments and colleges for consideration. Third, the project's potential application to other academic areas is analyzed. Projects which are so specific or narrow and have little relationship to other parts of the University are generally refused. Fourth, the EDP directorate appraises all possibilities of evaluation: Procedures for evaluation are built into all projects. Projects are supported by EDP through the experimental phase. Upon their successful completion, EDP recommends that the university funds necessary to carry on the innovation be placed in the appropriate department or college budget.

Qualifications and Responsibilities of Program Advisory Group and of Program Administrative and Staff Personnel: Since the Educational Development Program function is to coordinate, facilitate, communicate, and stimulate educational development, there has been little reason for creating an extensive organization. With the establishment of the

EDP, no structured formalized program advisory group has been created. Program directors provide liaison with the established Academic Senate, related councils and other committees. The office of the EDP does not wish to duplicate any organization, structure, or capability already present in the University. In addition, it wishes to conserve its modest resources for academic development projects. At present, the EDP office consists of a director, an assistant director and one and one-half secretaries.

All of the Program's central administrative personnel have doctorates, professorial status, relevant administrative experience ability, and are national authorities in the areas of educational psychology, measurement, technology, and research.

Beyond this small core program staff, a number of experts from the regular University faculty are supported on a part-time, released-time basis to provide necessary guidance and assistance in the implementation of faculty-designed projects. In addition, EDP is receiving material support from such groups as Institutional Research, Evaluation Services, Closed Circuit Television and the Media Center. Finally, EDP hopes to be able to provide a focal point for at present unstructured capabilities in such areas as programmed learning and computer-assisted instruction. If additional help is needed, it will be placed within the framework of existing structures.

Specific Methods of Program Evaluation: Recognizing the number of areas and levels in which EDP has worked, it is difficult to assess,

with any degree of certainty, the amount of change directly attributable to the program. Without question, some of its accomplishments must be related to the "institutional environment," which it has helped to develop and within which it works.

At least four criteria may be used for judging the program itself. One criterion is the frequency and degree of participation which it has had in the major educational movements within the university. It can be demonstrated that EDP has provided service and support in connection with a large percentage of the recent changes occurring within the institution. A second criterion is the extent to which innovative ideas have moved from department to department. Again, numerous instances can be cited to show that measures which have produced successful developments in one department have been copied, where appropriate, by other departments. A third criterion is the positive result accruing from intensive evaluation of individual projects supported by EDP. These evaluations of both learning and student attitudes clearly indicate success in a number of areas. What might be called the "multiplier effect" is the fourth criterion. In the first three years of formal operation, the number of project requests had quintupled. The evidence of increasing educational development at an even greater rate is apparent and should continue with adequate University executive administrative support.

While the successes of the Educational Development Program appear to be significant, it is also important to recognize that the program has had its failures. There are, for instance, significant "failures by ommission." Some departments in the university have not sought

the help or support of the program. Subjective judgment of this failure leads to the conclusion that the willingness to consider innovation is related to the sensed need to solve problems. Many faculty members apparently are not interested in considering new or improved methods if traditional patterns seem to work. If the number of faculty and staff is adequate, if the technical and learning resources are sufficient, if the class section size is reasonably small, and if the vocational and professional accrediting obligations are met, there may be little motivation to scrutinize present instructional practices for the improvement of learning.

The Pennsylvania State University

Program Title, Purposes, and Priorities: The University Division of Instructional Services has been designated the responsibility of providing professional guidance and technical assistance for all phases of resident instruction throughout the University system. The major goal of the Division is to assist colleges, departments, and individuals on all campuses with instructional improvement and design development. The Division's basic responsibilities are to coordinate and to extend services in support of instruction, with the objective of improving the quality of learning.

Increased emphasis is being accorded the Penn State Division of Instructional Services. Instructional television utilization development was pioneered in the 1950s at Penn State. A significant quality and amount of learning technology research has been designed and developed by Penn State personnel. In a cooperative effort with the faculty, the Division has fully implemented assistance in the systematic development of courses, the planning and evaluation of new learning methods and procedures, and the designing of instructional systems and facilities. Starting in the summer of 1970, the Division's totally integrated instructional design team will have all services available in a centralized facility. This new Division facility is designed to enhance coordination and systematization of its services.

The major services of the Division include: Instructional Research and Course Development; Producation of Instructional Resources;

Evaluation of Learning; Faculty Inservice Instruction; and the Coordination of Instructional Services for Commonwealth Campuses.

Instructional Research and Course Development provides academic departments and faculty members with assistance in planning and evaluating instructional programs and methods. A professional staff is available for consultation concerning course development, instructional technology, production of special materials, and the design of new instructional systems and facilities. Special emphasis is placed on the evaluation of new procedures.

This Divisional section maintains an information center of new instructional developments. Personnel also provide assistance in preparing proposals to obtain support for research on important aspects of teaching and learning at the University.

Leslie P. Greenhill, director of the Division writes:

> Instructional Research is put first because, as in most endeavors, it constitutes the best foundation for advancement. Although universities have been noted for their research efforts in most areas of human knowledge, it is only in recent years that they have begun to examine critically their own teaching efforts. Research on methods of mediating information and stimulating human learning is long overdue. In the United States it has been advancing rapidly during the past ten years or so, first with the financial aid of the philanthropic foundations, and more recently with the support of the Federal Government, which now makes research grants for a wide variety of experiments on teaching and learning.[6]

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[6]Leslie P. Greenhill, "Learning Resources for Higher Education" Medical and Biological Illustration, XIV (October, 1964), 256.

The Course Development section of the Division provides complete instructional design expertise. The emphasis of learner performance; kinds of learning; learning structure and sequence; selection of learning resources; media programming; program revision; and overall evaluation, feedback, and revision and re-evaluation is evident in Course Development assistance.

Learning-instructional resources production expertise and facilities are an integral element of the Division. Specific production services include: Instructional Television Services, Motion Picture Services, Instructional Graphics Services, and Still Photography Services.

Instructional Television Services provides videotape recording and closed-circuit television facilities and personnel to support the Resident Instruction Program of the University on all campuses. This service has a staff of production specialists who work with faculty members in developing and adapting courses for presentation via television. Courses can be recorded on video tape or presented live over an extensive closed-circuit facility at University Park. The scheduling of regular courses on closed-circuit television are arranged through the University Scheduling Officer.

The staff of Instructional Television Services also assists academic departments with portable television equipment. The Service extends assistance in preparing slide-sound presentations and audiotape recordings to be used in the Resident Instruction Program.

Motion Picture Services offers a complete film production serv-

ice to all departments of The Pennsylvania State University. This service was established to provide a professional production facility which can supply appropriate teaching, research, and informational films for use by the University.

Motion Film Services is equipped to process synchronous sound, silent, high speed, time-lapse, and cinematography. Also offered are production of professional audio recordings for teaching or broadcast at location or on sound-stage filming sets. Production services such as editing, titling, sound track, and laboratory preparation are available.

Expertise is available for consultation on film production problems. All photography is completed in the 16mm format, and prints can be released in 16mm, standard 8mm or super 8mm formats.

Films for regular instructional programs at any campus of The Pennsylvania State University system are financed from a department's instructional budget and are produced for the cost of materials and laboratory charges with no charge for labor. All other film productions are billed at actual cost, which includes labor. After a film production project has been discussed, an estimate of costs is sent to the requesting department.

The Instructional Graphics Services provides assistance to the faculty on all campuses in the preparation of visual material for the Resident Instruction Program. This Services section produces many kinds of visual materials including lettering, illustrations, charts, diagrams, television art work, and transparencies for use on the overhead projector.

A staff of professional artists is available to graphically design and develop materials. A cost of only materials is charged to departments for work prepared for use in Resident Instruction Programs. Materials produced for uses other than Resident Instruction are charged on the basis of time and materials costs.

The maintenance of a flexible working schedule is placed on a high priority in order to accommodate all job requests. The advance notice required for a job depends on the length of time needed for its completion. On the average, a week's notice is adequate for the completion of most jobs. This Services unit strives for complete articulation of schedules and job priorities. Complete visual resource consultation and planning assistance are available.

Still Photography Services is staffed and equipped to meet the needs of the University faculty and staff. Photography costs are assessed for the use of materials and processing only; no charge is made for labor. Photographic work for research and other non-resident instructional program puposes is billed at actual cost.

Photography staff members assist faculty members in composing and developing creative photographic materials for the instructional process. Consultation is offered on preparation, production, and presentation of photographic materials. Services are available with studio setting conditions or on location.

Still Photography Services produces instructional slides including 35mm film slides in color or black and white. All types of mounting are available for 2" x 2" or 3 1/4" x 4" slides. Contact

prints, enlargements, and mounted print service is available for Resident Instruction.

Audiovisual equipment delivery with equipment maintenance and film library services are a University Extension Division responsibility. This agency along with Academic Services, a technical operations organization, support the Division of Instruction Services activities, but they are separate agencies.

The Examination Services section of the Division provides assistance to the faculty in the area of testing. The Services unit facilitates the evaluation of student learning and conducts research related to testing. There is no charge for these services for Resident Instruction.

A professional staff is available to consult with faculty members concerning the construction, revision, and interpretation of all types of examinations, including essay. A general course attitude questionnaire has been developed for diagnostic use in University courses. Tests are validated and norms established on the basis of test results. Factors involved in test performance are investigated.

Examination Services processes test and questionnaire data for the faculty. Test scores can be accumulated and summarized at the end of each term. This unit is equipped with two optical scanners, one with a card output, and the other with tape output; an interpreter; a card sorter; and key-punches. Fully developed computer programs are available for processing examination data.

Assistance is provided for the development and standardization

of tests used for advanced placement of students in course sequences.

Division Director L. P. Greenhill relates the evaluation of learning rationale:

> An important aspect of teaching is the evaluation of students' performances. It is necessary to know whether students are meeting required standards and whether the instruction is satisfactory. Furthermore, the kind of examinations that students are given to a large extent determines the kind of learning that they acquire.
>
> Unfortunately, many teachers become fixated on a particular kind of testing, i.e., the essay test or the objective test, each of which has its advantages and disadvantages. Furthermore, few teachers know how good (or how poor) their tests actually are. Tests are rarely analyzed for reliability or ability to discriminate the better learners from the poorer learners.
>
> It is suggested that there is a wide variety of testing procedures that can be used to assess various kinds of learning, and that new kinds of tests need to be developed. Such a program requires specialists who work in close conjunction with subject matter experts. This type of support can be invaluable to a faculty in improving examinations, establishing standards, and raising the quality of learning.[7]

Faculty Inservice Instruction is another basic function of the Division. Because most faculty members have not had extensive pedagogic training, demonstrations and inservice learning services are made available. Workshops are provided in the areas of instructional methods, implementation of all learning resources, and the development and analysis of behaviorial objectives and evaluation.

The Instructional Services for Commonwealth Campuses provides liaison coordination between the State University branches and the Divi-

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[7] Ibid., pp. 257-258.

sion. All Services are made available to faculty members of the Commonwealth Campuses on the same basis as they are for the University Park Central Campus faculty members. The coordinator of this unit consults with interested Commonwealth Campus faculty members about the Division's various services.

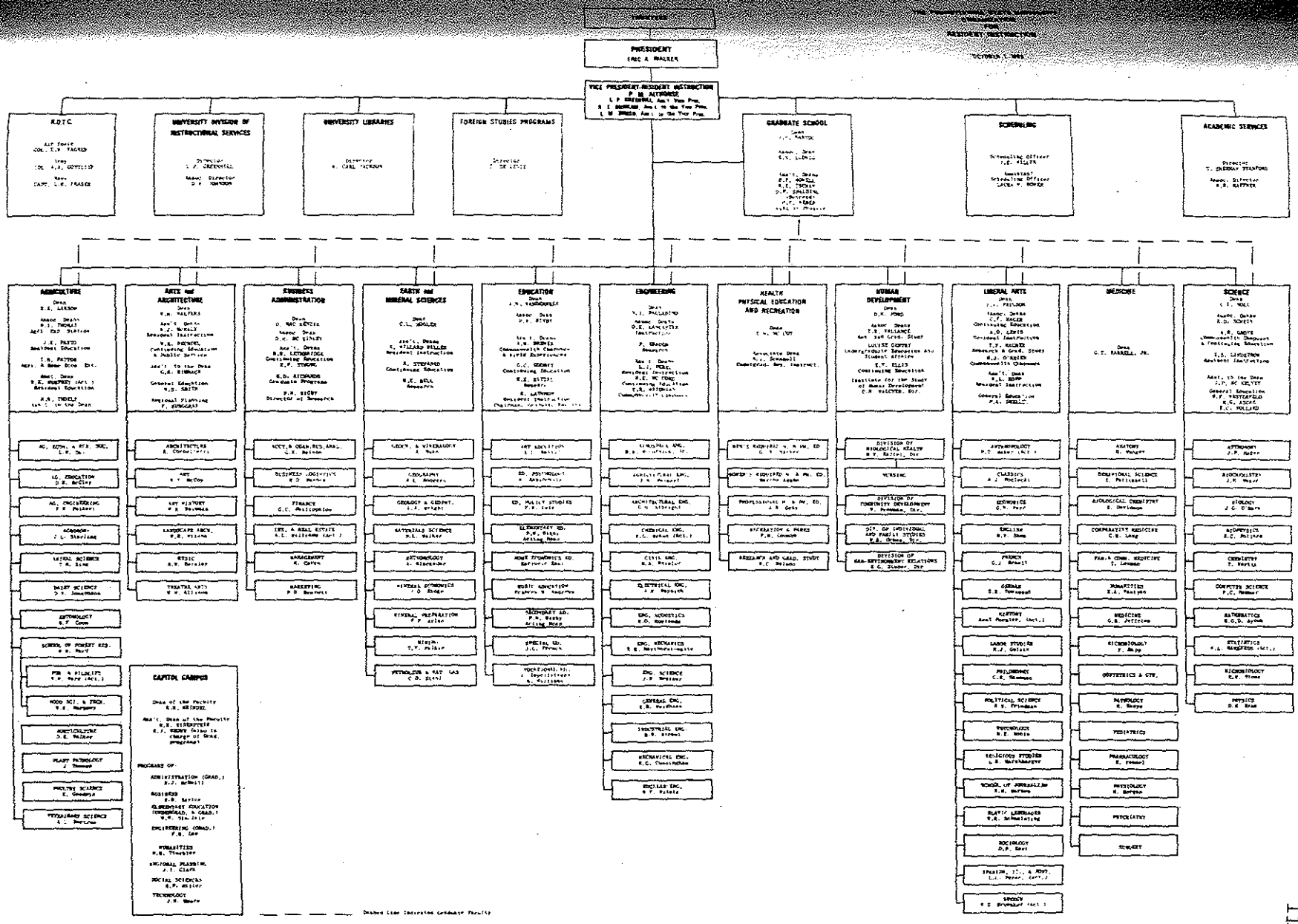
Concerning Division priorities at Penn State University, major responsibility for defining curricula goals may rest with the Board of Trustees, the central administration, the colleges, the individual departments or the various committees of the University System.

The University Division of Instructional Services has a basic responsibility for the coordination of Instructional Research and Course Development with all academic support Services and the Commonwealth Campus Coordination Services. A basic responsibility of the Division is the provision of professional guidance and technical assistance to all phases of resident instruction throughout the University System. The major concern of the Division is to assist colleges, departments and individuals on all campuses in attaining their objectives of quality instruction. Emphasis is placed on all aspects of learning design application and research. All academic resource production facilities and Services are fully established and available for Resident Instruction. The Division's five areas of technical services--Examination Services, Instructional Television, Motion Picture, Still Photography, and Instructional Graphics--are designed to offer efficient back up support for academic faculty members. No charge is made to Resident Instruction departments except for basic materials. All of the Division's Services

are provided in response to college or departmental requests. Progress in the improvement of Resident Instruction is almost totally dependent upon faculty involvement and response. However, the Division's approach to centralize and physically integrate all of its personnel and Services in a single building will enhance Services' central availability and coordination.

Administrative Structure of the Program with Relationship to the University's Chief Academic Officer: The University Division of Instructional Services is an agency of the Office of the Vice President for Resident Instruction. The Division's Director is the Assistant Vice President of Resident Instruction with direct articulation and program liaison to the Office of the Penn State University President. See following page of the Pennsylvania State University Organization for Resident Instruction. Individual faculty members and academic units of Resident Instruction may utilize at their request all Services.

Qualifications and Responsibilities of Program Advisory Group and of Division Administrative and Staff Personnel: Because of the direct involvement of the Office of the Vice President for Resident Instruction, no central advisory group is recognizable. However, the Division interacts with the University Senate, University Senate Committee on Resident Instruction, Administrative Committee on Educational Procedures, Planning Committee for Instructional Services Building, Planning Committee for Listening Learning Center, Central Fund for the Improvement of Teaching, and others.


TRUSTEES
PRESIDENT
ERIC A. WALKER
VICE PRESIDENT-RESIDENT INSTRUCTION
P. M. ARTHUREE
ROTC
UNIVERSITY DIVISION OF RESIDENTIAL SERVICES
UNIVERSITY LIBRARIES
FOREIGN STUDIES PROGRAMS
GRADUATE SCHOOL
SCREENING
ACADEMIC SERVICES
AGRICULTURE
ARTS and ARCHITECTURE
BUSINESS ADMINISTRATION
EARTH and MINERAL SCIENCES
EDUCATION
ENGINEERING
HEALTH PHYSICAL EDUCATION AND RECREATION
HUMAN DEVELOPMENT
LIBERAL ARTS
MEDICINE
SCIENCE
CAPITAL CAMPUS
Dashed line indicates graduate faculty

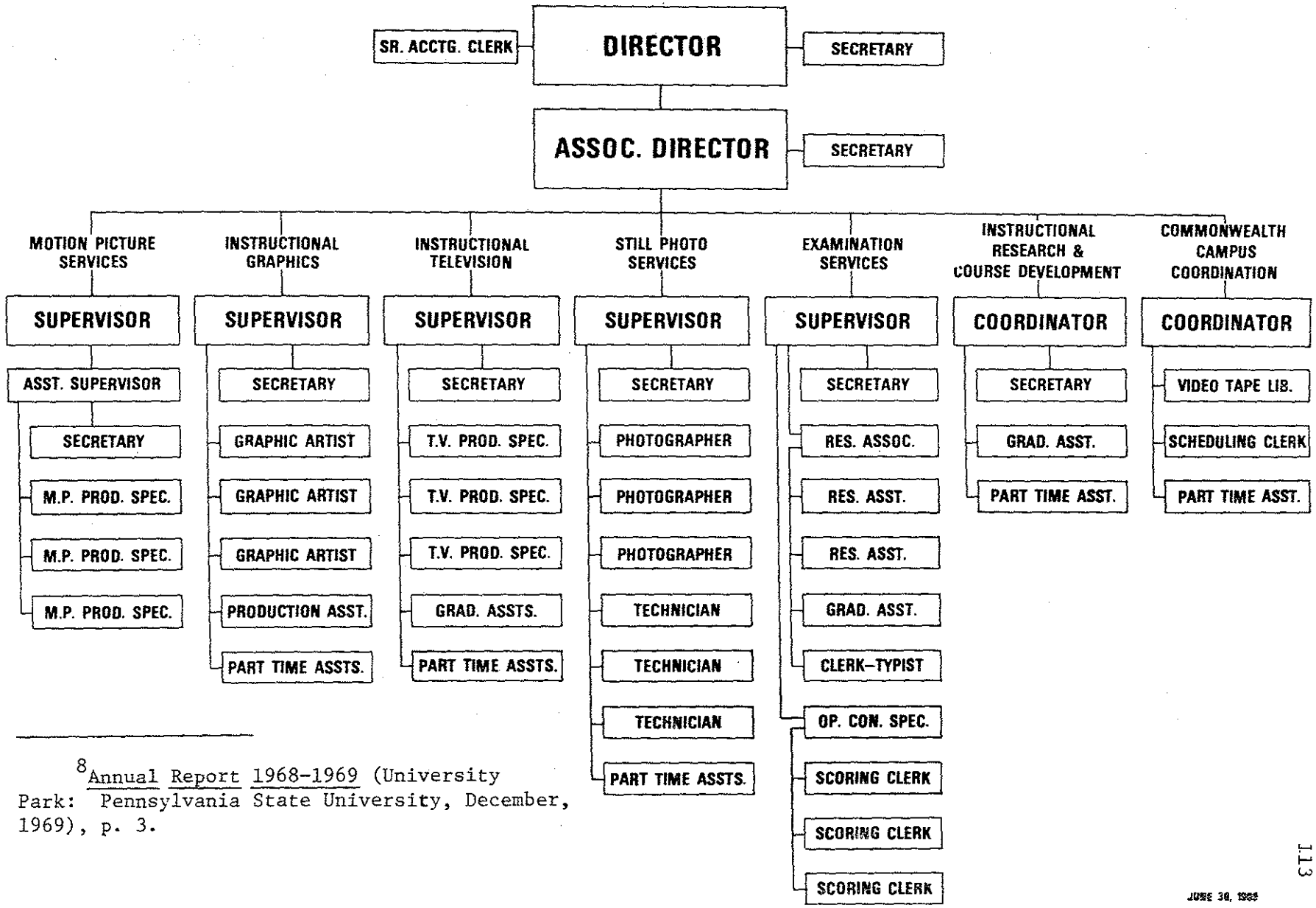
Administratively the Division has a director, an associate director, two coordinators, four supervisors, one assistant supervisor, one senior accounting clerk, seven secretaries, twenty-seven specialists and technicians, and a number of part-time assistants. See University Division of Instructional Services Personnel flow chart on the following page.

Division central administrative personnel have top University administrative status and professorial rank. Administrative personnel have relevant administrative experience ability, and are national authorities in educational psychology, measurement, technology, and research. The systems approach as applied to the implementation of instructional television was pioneered at Penn State. Administrative members are known both nationally and internationally for instructional design expertise.

Specific Methods of Division Evaluation: The criteria for evaluating the Division's contributions in assisting the improvement of instruction are evident in a "growth" systems approach. As an instructional design program advocates the systems approach for the improvement of instruction, the Division applies this principle internally with evaluation criteria to permit "check and balance" with modification capabilities.

The Division's Annual Report analyzes all major activities including all significant learning research; identifiable changing learning trends; individual Services activity records; Division personnel

UNIVERSITY DIVISION OF INSTRUCTIONAL SERVICES[8]



[8] Annual Report 1968-1969 (University Park: Pennsylvania State University, December, 1969), p. 3.

publications, University committee interaction with Division personnel, and professional organizational involvement of the Division. Special emphasis has recently been placed on course attitude questionnaires which were administered to approximately 2,000 students in about 150 classes. The norms for the measurement instrument are now based on over 600 University classes and over 17,000 students. Questionnaires were also administered to over 1,000 students for the purpose of evaluating the effectiveness and improving the quality of televised instruction.

The University of Washington
A Proposal:

Proposal Rationale and Development: A letter from the University of Washington Provost authorized the initiation of the special *ad hoc* Committee to Study Instructional Media with Professor Gerald M. Torkelson, chairman. The transcript of the *ad hoc* Committee letter appeared in the minutes of the meeting of the University Senate:

Dear Colleagues:

Over the past decade the technology of devices for the support of instruction has had striking development. With increasing enrollments in colleges and universities and a limited supply of prospective faculty, this development probably will accelerate during the next decade. Compared to private industries and military organizations, universities and colleges have been slow to take advantage of the possibilities of the new educational technology. Older institutions have a heritage of instructional practice established long before such equipment was available. The newly developing colleges and universities are able to include extensive facilities to support instruction in their original building with equipment plans and to some extent may use interest in the exploitation of these facilities as one criterion for selecting faculty.

On this campus the development of supportive instructional techniques has been uncoordinated and to some extent sporadic. Closed-circuit television, broadcast television, programmed instruction, audiovisual aids, film making, and radio are scattered among several offices; and occasions for faculty to learn about new possibilities for their use, whether by study or experience, have been limited. Clearly, however, if the time and talents of the faculty are to be given maximum effectiveness in meeting new enrollment demands, we must explore the potential usefulness of instructional technology.

I am, therefore, asking a committee of the faculty to advise me on ways in which this technology can be used to improve instruction and can help meet the challenge of the changing conditions of education.

That some of the devices now available have been found useful aids to instruction seems to be indicated by their acceptance

and consistent use in many courses on the campus. That they can, in certain cases, be used to improve instruction also has been amply demonstrated. To know whether wider application is possible or new means should be introduced requires study of the general academic assumptions that underlie questions concerning the appropriateness of any given instructional aid. The committee should address itself to the ends to be sought before considering the means for attaining them. We must know how the use of machine-mediated communication in learning may modify traditional concepts of university instruction and the role of the faculty. Are there ways in which instruction can be individualized, to allow for different rates of progress among students, with possibility of credit by examination either in conjunction with or in lieu of course attendance? To what extent are faculty and teaching assistants now performing tasks from which instructional technology might relieve them without detriment to the quality of instruction? Is the best possible use of faculty time made by present methods of instruction? To what extent do opportunities exist for improving the quality of instruction through increased use of instructional aids?

The answers to such questions will necessarily lead the committee to a consideration of existing facilities and their current use. Assuming for the moment that our utilization of these media is not optimal, the committee should develop a general plan for the future development of instructional technology on this campus with attention to some of the crucial problems of policy and implementation. For example, how is the faculty to gain experience in the use of appropriate devices where these have proved their effectiveness? Are additional facilities needed and what are the space requirements? What faculty effort is required for the preparation and evaluation of programs and how should this be reflected in their assignments and teaching loads?

No less important are questions concerning what protections of copyright, or other faculty and student rights, should be incorporated into any plan for the development of instructional materials. It might also be asked whether there are advantages in the sharing of university resources with other institutions in this state or in others.

The committee will, in effect, be defining the problems, surveying the existing situation, looking at other institutions of higher learning both for pitfalls to be avoided and procedures to be adapted to our own use. They should feel free to call upon anyone at the University who may have special knowledge of needs and possibilities in these areas

and at one time or another will probably wish to talk with staff or faculty members working with programmed learning, audiovisual services, closed-circuit television, broadcast television, motion picture production, or radio broadcasting. The investigation has many facets and the committee probably will wish to report on specific aspects of problems as they proceed. I would appreciate it if I might be kept abreast of committee progress, to give me some idea of the direction the investigation is taking.

Because these larger questions embrace those that have been considered in some depth by the *ad hoc* Committee to Study Programmed Self-Instruction under the chairmanship of Professor Carl B. Allendoerfer, in behalf of President Odegaard I am now discharging that committee with thanks for the work they have done. Continuity in this aspect of the discussion will be assured by the presence of Professor Allendoerfer on the new committee.

The only way to solve the problems we face is to look clearly at the possibilities for action inherent in the means available to us. If we are not to be set in confusion by changes in the circumstances of our work, we must analyze both the situation and our power to modify it. I hope you share with me this concern and will help us work towards an answer.

Sincerely yours,
Solomon Katz
Provost[9]

In a later University of Washington Senate Bulletin, *ad hoc* Committee Chairman Torkelson makes the following progress report:

The Committee met from January, 1966 to March, 1967. Its work was of two types. One concerned itself with the expediencies of existing conditions on-campus and the need to move ahead in suggesting improvements. The other involved numerous discussions which attempted to define the more long-range purposes of the Committee.

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[9]Solomon Katz, "Transcript of *ad hoc* Committee Letter" University of Washington Senate, Class C, Bulletin No. 163 (Seattle: The University of Washington, December 9, 1965) pp. 5-6.

To fill gaps in its knowledge about existing facilities and services on campus and about faculty interests and capabilities in the use of instructional media, the Committee developed a questionnaire to assess faculty needs and interests. The questionnaire was sent to about twenty per cent of the faculty on a random basis. The fifty per cent of the sample who returned the questionnaire indicated almost unanimous interest in the improvement of instruction through the use of media and requested the development of adequate facilities and services in this area.

Interviews were held with a number of people on campus who were engaged one way or another with media services of various kinds. Teaching facilities were also visited for purposes of suggesting improvements. Subsequently, improvements were made in ten teaching auditoria as a result of the committee's activities.

By far the easiest job of the Committee was to deal with the tangibles of teaching facilities and to identify the agencies on campus which could contribute to over-all developments in media. Much more difficult and elusive was the principal mandate of the Provost, "to consider ends before means." The more the Committee became involved in the basic issues, the clearer it became that such questions as individualizing instruction, credit by examination in lieu of course attendance, faculty rights when lectures and other materials were recorded were clearly the prerogative of the faculty in general, not the prerogative of the *ad hoc* Committee. It was also recognized that to suggest changes in basic instructional procedures at the University without complete faculty and student study of the matter would be less than judicious.

Underlying much of the Committee's discussions appeared a tacit understanding about various media and instructional systems which became a basis for suggesting the subsequent course of action recommended to the Provost.

These assumptions were in the final report to the Provost. In edited form they are:

1. A basic purpose of a University is to provide the best instruction possible.

2. In order to provide the best instruction, it is necessary to recognize that students vary in their capabilities and talents and that the University community must make decisions about which differences are to be met and under what circumstances.

3. Individuals prefer to learn in different ways and these ways must be available to provide for these preferences.

4. Any modern educational system has available to it today all the traditional methods of communication, plus the many "newer media." These tools and facilities should be available so that experience may be gained in determining which may be useful for the improvement of instruction.

5. By providing the best of instructional technology, faculty have tended to become more curious and experimental about their own methods of instruction and students have exhibited greater interest in learning.

6. By applying systems analysis methods to course structuring, matching methods and media to learners, purposes, and content, the likelihood of meeting student needs appears to be enhanced, and without a complete dehumanization of the learning process. In fact, the proper matching of instructional technology to course purposes appears to have resulted in opportunities for faculty freed from instructional tasks which may be machine mediated, to devote more time to personalized student contact.

7. For the above conditions to be realized it follows that some University-wide coordination of instructional media services and development is in order.[10]

In essence, then, the Committee concluded that a structure was needed to expedite, coordinate and consolidate present services of existing agencies on campus and to support faculty efforts in course improvement.

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[10]Gerald M. Torkelson, "Special Report of Council on Academic Standards: Instructional Media," University of Washington Senate, Class C, Bulletin No. 179 (Seattle: The University of Washington, May 23, 1968), pp. 8-9.

The Proposed Program Title, Purposes, and Priorities: The Office of Learning Resources is proposed to coordinate the activities and developments of the two major subdivisions, the Learning Resources Services and the Learning Resources Research and Development. This structure or organization recognizes current constituted faculty groups and University agencies. This proposal thus attempts to coordinate the facilities and capabilities already in existence and to broaden services to faculty.

The Learning Resources Services section would be concerned primarily with expediting service to faculty and students. This section could acquire and produce instructional products. This Services unit could be responsible for all components to be included in all learning stations, individual and group. Basically the Learning Resources Services would coordinate the following agencies: Audiovisual Services, Closed Circuit Television, Film Library Service, Language Lab, Computer Center, Radio, Library, and Bureau of Testing. All of these services are perceived basically as technical dissemination or resource production agencies.

The Research and Development unit would assume major responsibility for supporting instructional improvement. Basic areas of concern include consultation, testing and evaluation, faculty training, instructional systems development, experimentation of University instructional procedures, faculty rights, student rights, liaison-research proposals and funding, and the dissemination of current instructional practices.

The activities of Research and Development would not reduce a faculty member's autonomy in areas of instructional improvement. This supporting unit would become an additional arm for the faculty in solving instructional problems. A faculty member or any University academic unit wishing to organize a specific learning strategy with the incorporation of media in the appropriate manner could contact Research and Development. This support section would assist with course objectives, evaluation, and the resources. All cooperative Services of relevant agencies already in existence at the University would be utilized.

The proposal relates that the exact functions of both subdivisions of the Office of Learning Resources would be determined only after directions were issued from various representative Councils.

Several priorities are stated in this *ad hoc* Committee to Study Instructional Media improvement of instruction program proposal. First is a suggested organizational pattern with a central divisional office with two subdivisions: the Learning Resources Services and the Learning Resources Research and Development. This top priority identifies and coordinates all present existing support agencies on the campus. It also suggests the establishment of an instructional design unit in the formulation of the Learning Resources Research and Development.

Secondly, the priority of the importance of media for instructional improvement is stressed. The mere virtue of the Committee formulation title "*ad hoc* Committee to Study Instructional Media" may suggest

that this priority would be emphasized. A statement in the University of Washington Senate Bulletin No. 179 relates, ". . .if the potentials of media for instructional improvement at the University were to be realized, a great deal of urgency would be evident, involving a commitment of personnel and monies to initiate action."[11]

Next the Committee lists the kinds of academic, operational, and policy issues which were raised during their proposal development process. All of these issues are listed for future consideration of the Council on Academic Standards:

> Instructional Media: Areas of Study Arising from Applications of Media to Instruction[12]
>
> 1. Validation of materials and techniques.
>
> 2. Evaluation of student performance, especially in independent study.
>
> 3. Deployment of faculty time and effort related to preparation of materials for large group presentation.
>
> 4. Teaching loads and assignments.
>
> 5. Faculty rights to materials produced.
>
> 6. Reorganization of courses and course materials to provide combinations of group presentations, discussions, and independent study.
>
> 7. Credit by examination, credit equivalency for independent study, and grading.
>
> 8. Providing for variable student learning rates and acceleration programs.

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[11] Ibid., p. 9.

[12] Ibid., p. 8.

9. Sharing independent study courses and materials among institutions.

10. Potentials and limitations of remote-access information retrieval systems, film loop applications, computer-assisted-instruction.

11. Facility and space requirements related to expanded independent study needs.

12. Maintaining balance between machine-mediated types of instruction and instructor-student interaction.

13. Inservice programs for faculty.

14. Back-up facilities, personnel, and budgets for applications of media to instruction.

Another priority following establishment of an instructional support agency with realization of the effectiveness of media, is the commitment to release faculty time required for instructional improvement. Without released time and without recognition and reward in the academic community for such instructional improvement, the Committee states that no far-reaching applications of media will likely occur. The Committee report states, however, that the problems of released time and the completeness of the administrative unit and its implied functions should be considered as separate issues.

Administrative Structure of the Program with Relationship to the University's Chief Academic Officer: The proposed Office of Learning Resources is structured in direct line with the University Provost's Office. Direct liaison would be available with the Provost and in turn to the Office of the President. See following page for the proposed Office of Learning Resources organizational flow chart.

Presently, instructional media services and activities are organized and administered in several areas: an upper campus Division of Instructional Media reporting to the Office of the Provost; a Language Laboratory under the College of Arts and Sciences; courses and laboratories in media use in the College of Education; and a grouping of units: Audiovisual, Closed-Circuit Television, Medical Illustration and Medical Photography in Health Sciences. The Division of Instructional Media on the upper campus consists of Audiovisual Services and Closed-Circuit Television Services.

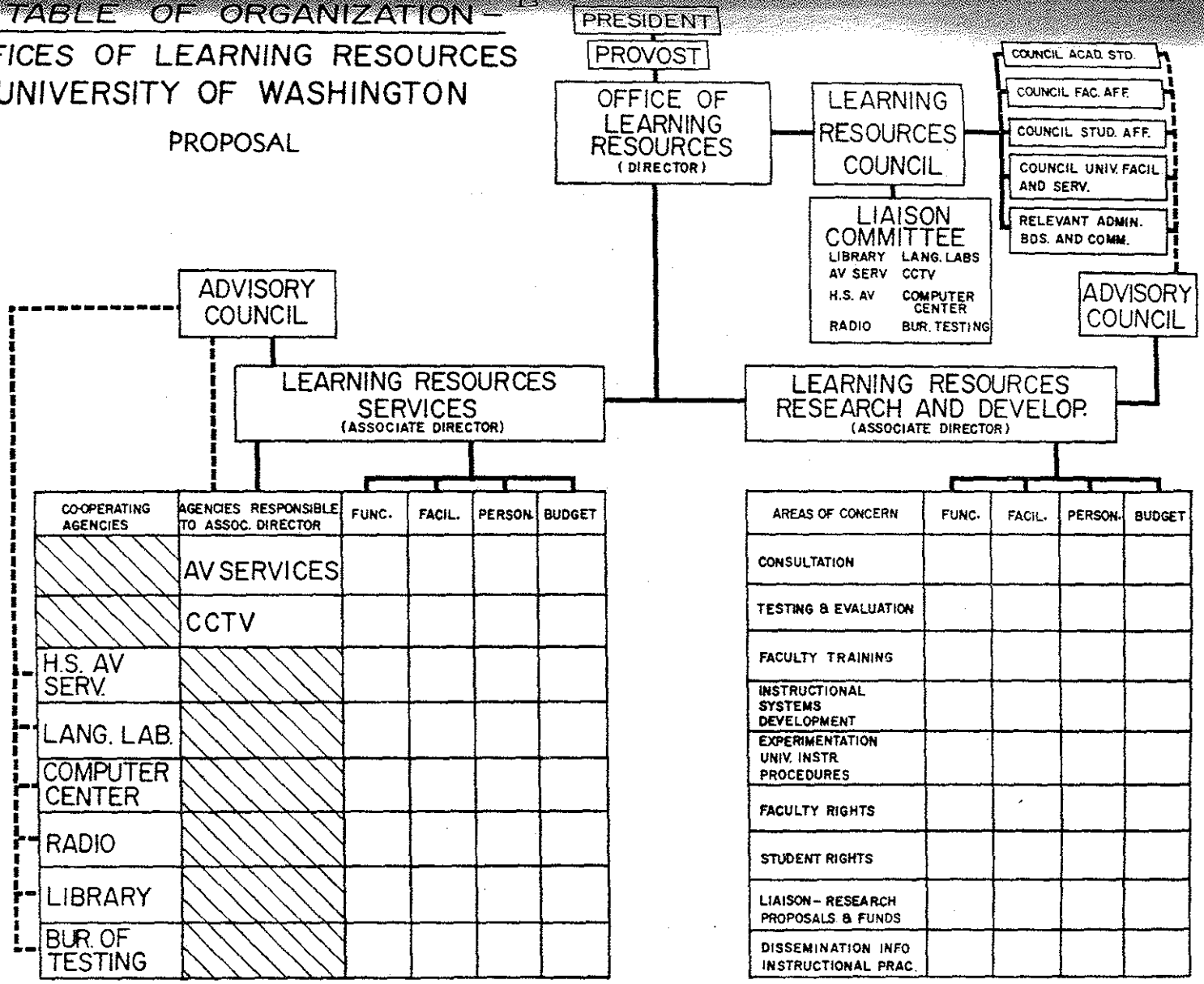
Qualifications and Responsibilities of Program Advisory Group(s) and of Program Administrative and Staff Personnel: The Office of Learning Resources proposal suggests formation of a Learning Resources Council with interaction with a Liaison Committee and all of the established academically related Councils. The Learning Resources Office Director would act in the chairman capacity of the Learning Resources Council. Membership on this Council would be composed of relevant representatives from the academic community and representing the academically related University Councils. This Learning Resources Council would determine program policy and priorities.

An advisory Liaison Committee would interact with the Learning Resources Council. Membership on this Liaison Committee would be composed of unit heads from the Library, Audiovisual Services, Film Library Services, Radio, Language Labs, Closed Circuit Television,

– TABLE OF ORGANIZATION – [13]

OFFICES OF LEARNING RESOURCES
UNIVERSITY OF WASHINGTON

PROPOSAL



CO-OPERATING AGENCIES	AGENCIES RESPONSIBLE TO ASSOC. DIRECTOR	FUNC.	FACIL.	PERSON.	BUDGET
	AV SERVICES				
	CCTV				
H.S. AV SERV.					
LANG. LAB.					
COMPUTER CENTER					
RADIO					
LIBRARY					
BUR. OF TESTING					

AREAS OF CONCERN	FUNC.	FACIL.	PERSON.	BUDGET
CONSULTATION				
TESTING & EVALUATION				
FACULTY TRAINING				
INSTRUCTIONAL SYSTEMS DEVELOPMENT				
EXPERIMENTATION UNIV. INSTR. PROCEDURES				
FACULTY RIGHTS				
STUDENT RIGHTS				
LIAISON – RESEARCH PROPOSALS & FUNDS				
DISSEMINATION INFO INSTRUCTIONAL PRAC.				

[13] Ibid., p. 14.

Computer Center, and Bureau of Testing.

Both subdivisions, the Learning Resources Services and the Learning Resources Research and Development would each have a subdivisional Advisory Council for coordination, direction, and evaluation.

The *ad hoc* Committee recommends that central administration of the Learning Resources Office have the following qualifications:

Director:
1. Earned Doctor's degree
2. Professorial status, tenured position
3. Relevant administrative experience and ability
4. Experience and preparation in areas of instructional media and technology, research, teaching, and learning.

Associate Director for Services:
1. Academic degree
2. Relevant administrative experience and ability
3. Knowledge of media and instructional technology
4. Preferably some college or university teaching experience

Associate Director Research and Development:
1. Earned Doctor's degree
2. Professorial status
3. Relevant administrative experience and ability
4. Preparation and experience in teaching, research and learning, preferably related to media and instructional technology.

The major responsibilities of the Learning Resources Office Director, apart from administrative functions, would be to serve as liaison between the Provost's Office and academic units. This liaison would concern the design, development, and implementation of various types of learning resources. The Director would be responsible for initiating relevant activities for the improvement of instruction as it is affected and enhanced by the use of instructional media in technology. He would also chair the Learning Resources Council.

Subdivisional Associate Directors would be responsible for their unit's coordination and for liaison with the Director. Most of the exact functions and personnel of both subdivisions of the Office of Learning Resources remain to be determined. Among the initial responsibilities of the Director and his two Associates would be the establishment of priorities among functions with the subsequent enlistment of necessary clerical and advisory assistance.

Specific Methods of Program Evaluation: A major criterion in the Division's evaluation is the structure of the Learning Resources Council and advisory councils for the two subdivisional units. Systematic feedback of the scope and nature of the program's interaction with the academic community would be made available to the Council, faculty, and central administrative staff. Another criterion is the validation of materials and techniques. Evaluation of student performance with special emphasis for independent study would comprise another evaluation criterion.

This proposal which outlines structure, functions, and priorities of the Office of Learning Resources was submitted March 2, 1967, at Provost Solomon Katz' earlier request. The *ad hoc* Committee on Instructional Media proposed the following recommendations:

> 1. At the earliest feasible moment, the Provost should make arrangements to create the Office of Learning Resources and its subdivisions, appointing the Director and two Associate Directors, and providing the necessary office space, facilities and clerical-secretarial staff.
>
> 2. Monies should be provided to allow the Director and Associate Directors to study existing organizations of a

similar nature at other universities and colleges. Part of this activity would entail some travel, with necessary photographic and recording equipment to document experiences and developments at other institutions. It is also assumed that among the first tasks would be the establishment of priorities and a review of organizational structure.

3. Consideration be given to ways in which faculty involvement in instructional improvement may be enhanced through the provision for released time and monetary support.

4. Dissolve the *ad hoc* Committee on Instructional Media unless there are relevant functions which need to be performed until the Office of Learning Resources is established. The Committee is willing to continue in whatever capacity the Provost deems necessary.[14]

Since the Committee report was submitted to the Provost, there has been a consolidation of Instructional Media Services and the creation of the Closed Circuit Television Services. A decision concerning the establishment of the Office of Learning Resources and particularly the Research and Development is contingent upon budgetary considerations and further study of the basic obligations of the University implied by such a unit.

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[14]*ad hoc* Committee on Instructional Media, Gerald M. Torkelson, Chairman. "*ad hoc* Committee Report on Instructional Media." A transcript of Office of Learning Resources Office Proposal with Table of Organization sent to Provost Soloman Katz (Seattle: University of Washington, March 2, 1967), pp. 12-13. (Mimeographed.)

University of California
at
Los Angeles

The Program Title, Purposes, and Priorities: A recent suggested proposal development effort "Criteria for Planning the University Learning Resources Center"[15] extends a plan for consideration at the nine University of California campuses. This currently developing plan may serve as a basis for the centralized academic support program scopes at both UCLA and Berkeley campuses of the University of California State System. These criteria for program planning include a variation of academic service scopes which are divided into four categories. See following page for chart which places these categories into four perspective areas.

The first category, Production Services, has four producing sections: 1) Television, 2) Photography, still and motion picture, 3) Graphics, and 4) Programmed Instruction. The second category, Group Presentation Services has two major sections: 1) Television and 2) Projection, Audio, and Film Rental. The third category, Self-Instruction Presentation Services, includes Self-Instructional Units. The fourth category, Instructional Development and Administration Services, is com-

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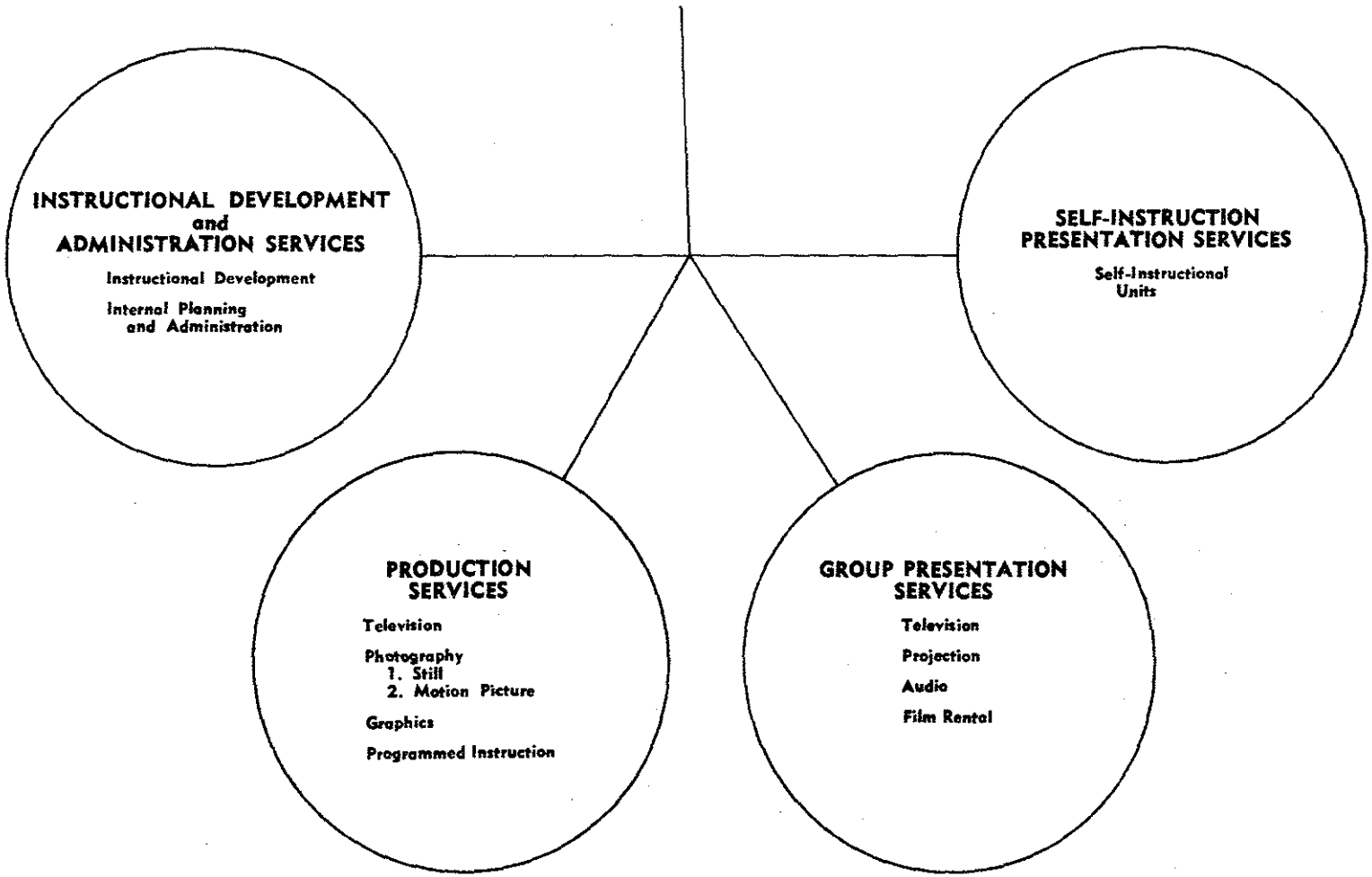
[15]Irving R. Merrill and Harold A. Drob, "Criteria for Planning the University Learning Resource Center," a report for the President's Advisory Committee on Educational Television (San Francisco: Communications Office for Research and Teaching, University of California, March, 1970), pp. 1-2. (Mimeographed.)

CRITERIA FOR PLANNING THE UNIVERSITY RESOURCES CENTER UNIVERSITY OF CALIFORNIA SYSTEM



prised of two sections; 1) Instructional Development and 2) Internal Planning and Administration.

Each subdivisional section is considered separately for modular development in variation of service, scope and total number of student enrollment. Each University of California campus determines the inclusion and further development of each subdivisional service section. A provision has been developed for a centralized maintenance of equipment in terms of financial economy for each campus.

Presently, the Academic Communications Facility serves as the major academic support service agency at UCLA. The Facility's current organizational chart identifies eleven separate sections and they include: Central Administration, Audiovisual Services, Audiovisual Technical Services Shop, Graphics and Illustration, Instructional Media Library, Motion Picture Production, Research and Development, Specialized Stock and Store, Still Photography, Television Engineering, and Television Production. An organizational chart of UCLA's present Academic Communications Facility with its eleven program sections is found on the following page.

In a telephone interview with the Director of the UCLA Planning Office, he told of a UCLA planned commitment to reorganize the present Academic Communications Facility.[16] Because the present traditional

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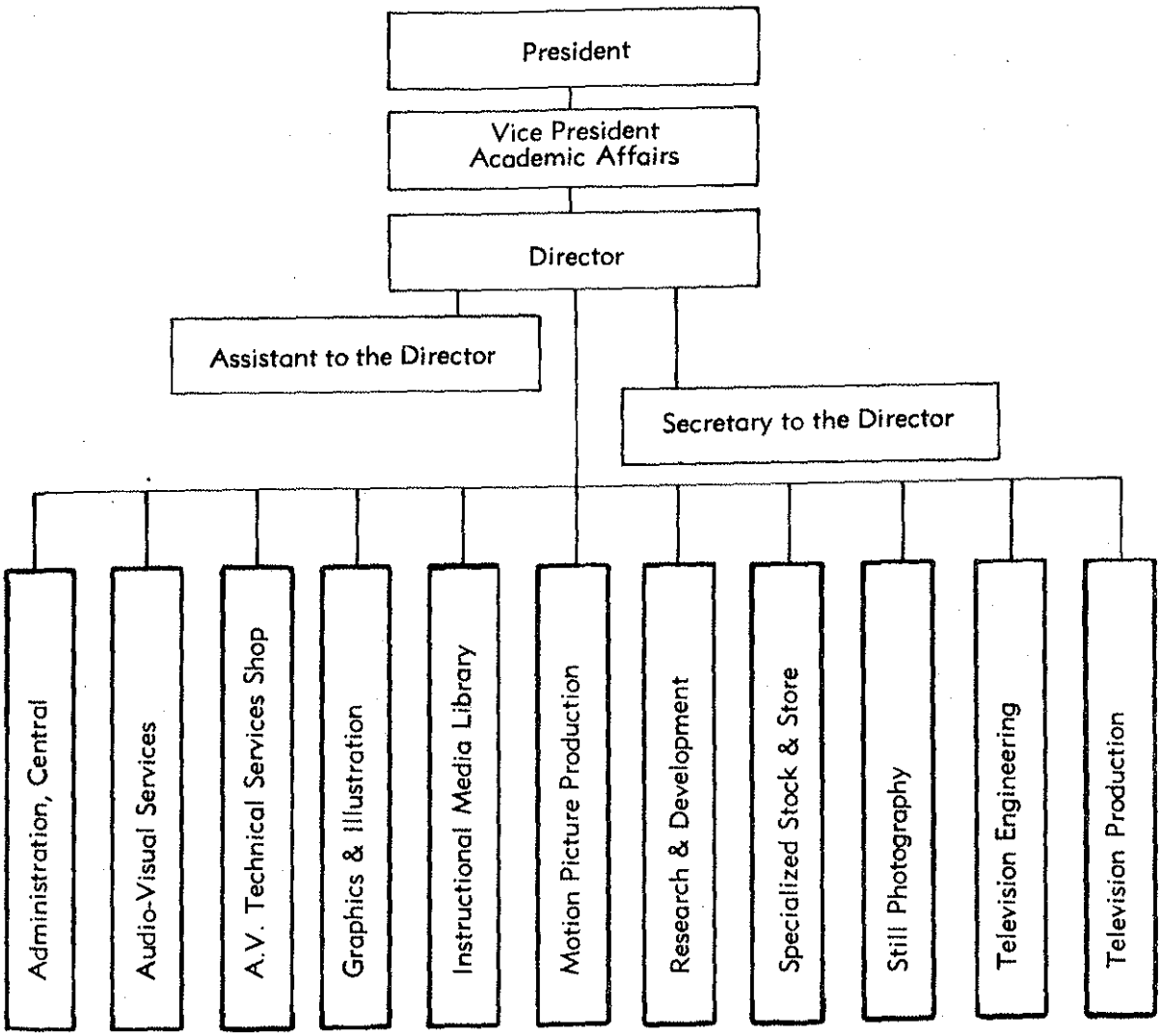
[16]Adrian Harris is the Director of University Planning, University of California, Los Angeles. His statements were made during a long-distance telephone conversation with the writer, Los Angeles, California-Lincoln, Nebraska, May 25, 1970.

ACADEMIC COMMUNICATIONS FACILITY[17]
University of California, Los Angeles



[17] Interim Policy of the Academic Communications Facility (Los Angeles: The University of California, January 5, 1970), p. 6.

organizational concept of the Facility is not systematically structured, the publication "Criteria for Planning a Learning Resources Center" may initially serve UCLA academic support, revision planning effort. All of the present sections of the Academic Communication Facility could be placed into the Criteria categories of Production Services, Group Presentation Services, and Administrative Service. This arrangement of classification however does not follow a systematic approach trend which this writer perceives to be infallible for dynamic, continual program modification designed to meet the needs of an ever-changing, unrestful university environment.

The present Facility sectional operations are described in the classification frame of reference of the proposed "Criteria for Planning a Learning Resources Center."

At present the UCLA Academic Communications Facility has implemented the following Production Services: Television, Still Photography, Motion Film, Illustration, and Graphics. The Television Production section assists faculty and administrative groups in areas of script writing, design, and the production-direction of both closed circuit and broadcast television applications.

Still Photography Services and Motion Picture Film Production places emphasis on scientific photography, including surgical projects, patient photography, micro and macro photography, art and architectural photography, slide production and duplication in both color and black and white. This photography section also maintains a supply sales store for the campus. Photographic supply needs and audio and video record-

ing tape are sold and distributed by this unit. The motion picture film production unit engages in the producing and editing of motion film. All motion film formats, 16mm, regular 8mm, and super 8mm single concept loop films are processed. Filmstrip production is a function of this unit also.

Illustration and Graphic Services provides certified medical illustrators, a scientific illustrator, and graphic artists for publication, television and motion picture presentations, transparencies for overhead projection; and designs and develops exhibit materials for presentation at scientific meetings.

Group Presentation Services maintains a stock of motion picture, slide, opaque and overhead projectors, tape recorders, portable public address systems, and related equipment for the campus academic program. This service unit is responsible for delivering instructional equipment to any location on campus with the necessary operating personnel. The Instructional Media Library maintains and acquires motion film, filmstrips, and audio and video tapes. Resource reference and off-campus instructional media acquisition services are provided as a function of this unit.

Instructional Development and Administration Services provide consultation in technology for the development of instructional systems as related to current and developing curriculum and for research, implementation, and evaluation of technical systems used in innovational procedures. Instructional Research and Development provides instructional design expertise for some course development with media applications.

The Administrative Services coordinates engineering consultation and maintenance. Consultation is available for the installation of appropriate television-sound systems, language laboratories, learning centers and related services for new and remodeled buildings. Emphasis is placed with instructional hardware systems as related to building design and with innovation and the application of instructional technology to instruction.

From the Administrative Service management and future Instruction Development needs, computer applications are being considered for four program categories. These categories include program accounting, workload and performance analysis, operations, and computer assisted instruction and information retrieval.

In the area of program accounting, a proposed computer base could calculate billings for each program department of labor, rentals, and materials costs and inventories; customer invoicing, and interdepartmental statements of revenues and costs. Administrative program planning, staffing, facilities, and operational systems workload and performance analysis management could be generated. With increasing enrollments and technological advancements at UCLA, this actual management need is critical. Last year, the program completed 26,000 jobs and booked over 36,000 Media Library orders.[18]

The operation's category of the program could be satisfied with

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[18]Ibid., p. 1.

a computer program. Complete cross-referencing of all instructional resources in addition to a total inventory of all equipment and materials could be procured daily. Automated information dissemination of learning resources could be made available by interest classification to learner and professor.

The computer program could provide research cataloging, storage, and retrieval systems for instructional needs. Because of the cost factors, a large enough system for computer-assisted instruction (CAI) and information retrieval is an impossibility at present for a single institution. However, a number of California institutions of higher education are adopting and installing digital retrieval systems, and CAI with related systems would not seem far behind.

Priorities of the program must be determined logistically in terms of the minimum and maximum scope of services. The minimum scope of service would provide the least number of available categories which could be fully justified as a campus-wide service. In turn, the maximum scope of services would include all justifable categories. Two intermediate levels of service scope have been considered between minimum and maximum extremes. Moving to the maximum on the level of service scope continuum facilitates logical and reasonable development planning. Initially, the advancement to a broadened service cope could be justified by the logical and reasonable instructional program service requests. A television service need may be low on a priority rating scale and thus be classified initially at "A" level. On the maximum scope extreme, a high priority may exist for

Instructional Development Services on a campus and "D" rating would be justifiable.

Another priority rating criterion is the actual resident student enrollment numbers. The student enrollment in the nine University of California campuses has provided a basis for establishing four levels:

I.	1,000 students	A practical minimum
II.	5,000 students	Irvine, Santa Cruz San Diego, Riverside
III.	15,000 students	Santa Barbara, Davis
IV.	27,000 students	Berkeley, Los Angeles[19]

The following criteria of scope and priority of service represent check-points for various stages of a justifiable long-range plan: A special formula was developed to completely justify total service personnel and space requirements. In development of this formula, an assumption is extended that during 1970, ten per cent of student learning contact time is accounted for by all learning resources except books. This learning resources contact time includes lectures, laboratories, discussions, quiz or review sessions, and individual study. With the ten per cent ratio formula, the average higher education student's learning contact time of a 45-hour work week, 4 hours and 30 minutes of time represents the direct contact with learning resources excluding printed materials. This four hours and thirty minutes of time, on the average, will be concentrated

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[19]Merrill and Drob, op. cit., pp. 2-3.

interaction with non-book learning resources, however, many courses may utilize a higher percentage than ten per cent. When all general campus courses in the 1970s are analyzed, researchers find that for every student who reaches 20 per cent or more of non-book resource utilization, three students will reach half of that percentage (ten per cent) and one of the five learners may make little or no use of resources other than the printed form. The ten per cent figure is considered conservative. This study also finds that during the 1960s, abundant proof that this percentage of learner concentrated contact with non-book resources represented less than ten per cent. It is equally difficult to consider that the ten per cent figure will remain insignificant for the coming decade.[20]

See the following eleven page section for a complete listing of service level scopes with student enrollments for suggested program staffing and space requirements.

Administrative Structure of the Program with Relationships to the University's Chief Academic Officer: The UCLA Academic Communications Facility is a Division of the Vice President--Academic Affairs Office. The program operates independently and does not have regular, systematic interaction with the Central Administration. Operational funds are directly allocated however from UCLA Central Administration.

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[20]Merrill and Drob, op. cit., pp. 4-5.

SUMMARY

		1000 Students		5000 Students		15,000 Students		27,500 Students	
		Staff	Space	Staff	Space	Staff	Space	Staff	Space
1. Production Services	Scope A	2.5	1000	4.5	1125	7.0	1875	8.0	2500
a. Television	B	6.0	1600	8.0	1925	13.0	3275	15.0	4300
	C	11.0	2200	13.0	2825	20.0	4575	22.0	5800
	D	16.0	2600	18.0	3225	27.0	5575	30.0	6800
b. Photography	Scope A	1.0	350	2.0	660	4.0	990	5.0	1370
	B	5.0	1306	6.0	1885	9.0	2640	12.0	3570
	C	12.0	3906	13.0	4880	15.0	6030	18.0	7430
	D	21.0	8551	23.0	10005	28.0	12200	34.0	14550
c. Graphics	Scope A	1.0	375	2.0	625	3.0	940	4.0	1250
	B	2.0	725	4.0	1375	6.0	1990	8.0	2650
	C	4.0	1375	8.0	2775	12.0	3990	16.0	5250
	D	6.0	1625	10.0	3125	16.0	4690	21.0	6150
d. Programmed Instruction	Scope A	1.0	90	1.0	90	1.0	90	2.0	175
	B	2.0	160	2.0	160	2.0	160	3.0	245
	C	3.0	230	3.0	230	4.0	300	5.0	385
	D	4.0	300	4.0	300	5.0	370	6.0	455
2. Group Presentation Services	Scope A	1.5	200	2.0	400	3.0	500	3.5	600
	B	2.0	300	3.0	600	4.0	800	4.5	1100
a. Television	C	4.0	600	6.0	1400	11.5	2800	14.5	3700
	D	4.0	600	6.0	1500	12.0	2900	15.0	4000
b. Projection, Audio and Film Rental	Scope A	1.0	200	3.0	330	5.0	510	8.0	700
	B	3.0	700	5.0	1085	8.0	1770	12.0	2400
	C	6.0	1250	8.0	1860	12.0	2970	15.0	4125
	D	12.0	2100	14.0	2960	16.0	4470	20.0	6200
3. Self-Instruction Presentation Services	Scope A	1.0	764	3.0	1892	2.0	3584	4.0	5276
	B	2.0	964	3.0	2092	4.0	3784	4.0	5476
a. Self-Instructional Units	C	2.0	964	3.0	2092	4.0	3784	4.0	5476
	D	2.0	964	3.0	2092	4.0	3784	4.0	5476

SUMMARY (continued)[21]

		1000 Students		5000 Students		15,000 Students		27,500 Students	
		Staff	Space	Staff	Space	Staff	Space	Staff	Space
4. Inst. Dev. & Administrative Services	Scope A	1.0	100	1.0	100	1.0	100	2.0	200
	B	2.0	200	2.0	200	2.0	200	3.0	300
a. Instructional Development	C	3.0	300	3.0	300	4.0	400	5.0	500
	D	4.0	400	4.0	400	5.0	500	6.0	600
b. Internal Planning & Adm.	Scope A	2.0	610	3.0	700	3.0	700	4.0	1015
	B	3.0	730	4.0	820	4.0	820	5.0	1135
	C	5.0	940	6.0	1030	6.0	1030	7.0	1345
	D	7.0	1150	8.0	1240	9.0	1330	10.0	1645
TOTALS	Scope A	12.0	3689	20.5	5922	30.0	9289	40.5	13086
	B	27.0	6685	37.0	10142	52.0	15439	66.5	21176
	C	50.0	11765	63.0	17392	88.5	25879	106.5	34011
	D	76.0	18390	90.0	24947	122.0	35919	146.0	45976

[21] Merrill and Drob, op. cit., pp. 6-7.

TELEVISION PRODUCTION SERVICES[22]	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope A								
1. Live and Recorded Lab Production	1.0	500	1.5	500	3.0	750	3.0	1000
2. Micro and Mirror Teaching Exercises	.5	375	1.0	375	1.5	625	2.0	750
3. Single Room Magnification	1.0	125	2.0	250	2.5	500	3.0	750
Scope B								
1. Scope A	2.5	1000	4.5	1125	7.0	1875	8.0	2500
2. Basic Studio Production	3.5	600	3.5	800	6.0	1400	7.0	1800
Scope C								
1. Scope B	6.0	1600	8.0	1925	13.0	3275	15.0	4300
2. Full Studio Production	3.0	400	3.0	600	5.0	800	5.0	1000
3. Large Auditorium Production for Multi-section Classes	2.0	200	2.0	300	2.0	500	2.0	500
Scope D								
1. Scope C	11.0	2200	13.0	2825	20.0	4575	22.0	5800
2. Remote Production	2.0	-	2.0	-	2.0	200	2.0	200
3. Quad Production, Edit, and Duplicate	1.0	200	1.0	200	2.0	300	2.0	300
4. Color Production	2.0	200	2.0	200	3.0	500	4.0	500
Total - Scope D	16.0	2600	18.0	3225	27.0	5575	30.0	6800

[22] Merrill and Drob, op. cit., p. 8.

PHOTOGRAPHY PRODUCTION SERVICES	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope A								
1. Copying of charts in black and white for prints (smaller than 10 inches in size)	1.0		2.0	125	4.0	127	5.0	255
2. Copying of materials for slides (all sent out for processing and mounting)		120		120		250		375
3. Public Relations Photography				55		125		125
4. Limited amount of dark room printing (bulk sent out to a commercial lab.)		230		360		488		615
Scope B								
1. Scope A	1.0	350	2.0	660	4.0	990	5.0	1370
2. Processing of black and white films		272		375		500		600
3. Reception of work and record keeping		100		125		175		200
4. Printing of black and white prints up to 11x14 size		286		350		425		600
5. Copying of charts, etc. (up to 24")		198		250		400		500
6. Simple location still photography		100		125		150		300
Add FTE's	4.0		4.0		5.0		7.0	

PHOTOGRAPHY PRODUCTION SERVICES (continued)[23]	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope C								
1. Scope B	5.0	1306	6.0	1885	9.0	2640	12.0	3570
2. Specimen and photo macrography		240		280		320		360
3. Simple motion picture productions		1360		1560		1760		2000
4. Large copy work (any size)		500		575		650		750
5. Custom slide mounting (glass, plastics, composites)		200		230		260		300
6. I. D. Photography		300		350		400		450
Add FTE's	7.0		7.0		6.0		6.0	
Scope D								
1. Scope C	12.0	3906	13.0	4880	15.0	6030	18.0	7430
2. Color film processing		1120		1205		1410		1630
3. Color printing		225		250		300		340
4. Photomicrography		300		350		400		450
5. Complete motion picture productions		1700		1900		2300		2700
6. Major location still photography		1200		1300		1600		1800
7. Reception and film file		50		60		80		100
8. Administration		50		60		80		100
Add FTE's	9.0		10.0		13.0		16.0	
Total Scope D	21.0	8551	23.0	10005	28.0	12200	34.0	14550

[23]Merrill and Drob, op. cit., p. 9.

GRAPHIC SERVICES	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope A								
1. Drawings, lettering (hand or transfer) for posters, notices, etc.	1.0	188	2.0	375	3.0	564	4.0	750
2. Signs, matting, framing, cutting		125		125		188		250
3. Supplies and storage		62		125		188		250
Scope B								
1. Scope A	1.0	375	2.0	625	3.0	940	4.0	1250
2. Mechanical lettering (LeRoy, Wrico)								
3. Drawings, diagrams, charts and graphs for photographic reproduction								
4. Artwork for duplication (brochures, booklets, etc.)								
5. Displays		100		150		200		200
6. Supplies and storage		100		300		400		600
Add FTE's	1.0	150	2.0	300	3.0	450	4.0	600
Scope C								
1. Scope B	2.0	725	4.0	1375	6.0	1990	8.0	2650
2. Headliner		50		100		150		200
3. Composing machine (Varityper)		50		50		100		100
4. Reproduction equipment (visual aid Printer, Zerox, etc.)		50		100		100		200
5. Exhibits		100		300		400		400
6. Models		50		100		150		200
7. Supplies and storage		50		150		200		300
Add FTE's	2.0	300	4.0	600	6.0	900	8.0	1200

GRAPHIC SERVICES (continued)[24]	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope D								
1. Scope C	4.0	1375	8.0	2775	12.0	3990	16.0	5250
2. Photostat Machine		50		100		200		300
3. Silk Screen Equipment		50		100		200		300
4. Plastic Models		150		150		300		300
5. Animation								
Add FTE's	2.0		2.0		4.0		5.0	
Total Scope D	6.0	1625	10.0	3125	16.0	4690	21.0	6150

[24] Merrill and Drob, op. cit., p. 10.

PROGRAMMED INSTRUCTION	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope A								
1. Assist faculty members in production of language laboratory audiotapes	1.0	90	1.0	90	1.0	90	2.0	175
2. Duplicate tapes for individual use								
3. Carry out brief assignments for faculty members in the production of graphic self-instructional materials								
Scope B								
1. Scope A	1.0	90	1.0	90	1.0	90	2.0	175
2. Accept assignments for as long as 4 weeks to work with a faculty member in rounding out instructional materials for difficult programmed courses	1.0	70	1.0	70	1.0	70	1.0	70
Scope C								
1. Scope B	2.0	160	2.0	160	2.0	160	3.0	245
2. Assist Educational Psychologist for Instructional Development in production of graphic self-instructional materials for completely designed course	1.0	70	1.0	70	2.0	140	2.0	140

PROGRAMMED INSTRUCTION (continued)[25]	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope D								
1. Scope C	3.0	230	3.0	230	4.0	300	5.0	385
2. Assist Educational Psychologist for Instructional Development in production of program for computer assisted instruction	1.0	70	1.0	70	1.0	70	1.0	70
Total Scope D	4.0	300	4.0	300	5.0	370	6.0	455

Note: This service consists of the supply of liaison personnel between faculty and production facilities of television, photography, and graphics. As the scope of this type of service increases, so must the production skills of the additional liaison personnel to be added.

[25]Merrill and Drob, op. cit., p. 11.

TELEVISION PRESENTATION SERVICES[26]	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope A								
1. Single Classroom Videotape Retrieval	1.5	200	2.0	400	3.0	500	3.5	600
Scope B								
1. Scope A	1.5	200	2.0	400	3.0	500	3.5	600
2. Cable TV Distribution to 4-6 General Assignment Spaces	.5	100	1.0	200	1.0	300	1.0	500
Scope C								
1. Scope B	2.0	300	3.0	600	4.0	800	4.5	1100
2. Cable TV Distribution Campus-wide	1.0	60	1.5	200	2.0	400	2.0	600
3. Helical VTR Loan Service	.5	120	1.0	400	3.0	900	4.5	1200
4. Vidicon Camera Loan Service	.5	120	.5	200	2.5	700	3.5	800
Scope D								
1. Scope C	4.0	600	6.0	1400	11.5	2800	14.5	3700
2. Microwave/2500 mHz Linkages with other campuses	-	-	-	100	.5	100	.5	300
Total Scope D	4.0	600	6.0	1500	12.0	2900	15.0	4000

[26] Merrill and Drob, op. cit., p. 12.

PROJECTION, AUDIO, AND FILM RENTAL SERVICES	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope A								
1. Loan service for Audio Visual Equipment (Pool)	1.0	100	3.0	200	5.0	350	8.0	500
2. Limited Projection Service		100		130		160		200
Scope B								
1. Scope A	1.0	200	3.0	330	5.0	510	8.0	700
2. Projectionist Service		100		200		350		500
3. Sound Recording Service		100		130		160		200
4. Film rental and booking (no permanent library)		100		125		150		200
5. Minor repair of equipment (maintenance)		200		300		600		800
Add FTE's	2.0		2.0		3.0		4.0	
Scope C								
1. Scope B	3.0	700	5.0	1085	8.0	1770	12.0	2400
2. Rental of films, ordering, cleaning, repairing and screening		300		400		500		800
3. Minor equipment repair		200		300		600		800
4. Complex projection services		50		75		100		125
Add FTE's	3.0		3.0		4.0		4.0	

PROJECTION, AUDIO, AND FILM RENTAL SERVICES (continued)[27]	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope D								
1. Scope C	6.0	1250	8.0	1860	12.0	2970	16.0	4125
2. Film Library		250		400		500		700
3. Audio tape duplication		50		50		100		200
4. Major projector repair		300		350		500		700
5. Off campus projection service		50		50		100		125
6. Production services for programmed presentations (multi-media)		200		250		300		400
Add FTE's	6.0		6.0		4.0		4.0	
Total Scope D	12.0	2100	14.0	2960	16.0	4470	20.0	6200

[27] Merrill and Drob, op. cit., p. 13.

SELF-INSTRUCTIONAL UNITS	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope A								
1. Provide individual student study facilities with a wide range of materials (audio, 8mm films, slides, TV, teaching machines, language training, small group study rooms, programmed texts)	1.0	764[1]	2.0	1892[2]	3.0	3584[3]	4.0	5276[4]
2. Collect and catalogue materials in cooperation with faculty								
3. Supervise operation and assist student utilization								
Scope B								
1. Scope A	1.0	764	2.0	1892	3.0	3584	4.0	5276
2. Central control center to transmit study material	1.0	200	1.0	200	1.0	200	1.0	200
Scope C								
1. Scope B	2.0	964	3.0	2092	4.0	3784	5.0	5476
2. Automatic dial-access system	-	-	-	-	-	-	-	-
Scope D								
1. Scope C	2.0	964	3.0	2092	4.0	3784	5.0	5476
2. Computer Assisted Instruction		100		100		100		100
Total Scope D	2.0	1064	3.0	2192	4.0	3884	5.0	5576

SELF-INSTRUCTIONAL UNITS (continued)[28]	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
1 1 - 8' x 8' Study Room 20 - Carrels								
2 3 - 8' x 8' Group Study Rooms 60 - Carrels								
3 6 - 8' x 8' Group Study Rooms 120 - Carrels								
4 9 - 8' x 8' Group Study Rooms 180 - Carrels								

[28] Merrill and Drob, op. cit., p. 14

INSTRUCTIONAL DEVELOPMENT SERVICE	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope A								
1. Offer general consultation to all faculty members on media effectiveness, course construction, and test development	1.0	100	1.0	100	1.0	100	2.0	200
2. Advice director on internal planning related to improved faculty support by the learning resources center								
Scope B								
1. Scope A	1.0	100	1.0	100	1.0	100	2.0	200
2. Consult and assist with experiments to improve the effectiveness of instruction. This scope requires person with considerable expertise in statistics and experimental design	1.0	100	1.0	100	1.0	100	1.0	100

INSTRUCTIONAL DEVELOPMENT SERVICE (continued)[29]	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope C								
1. Scope B	2.0	200	2.0	200	2.0	200	3.0	300
2. Provide detailed consultation with faculty member or faculty committee on design of a single course, integrating all appropriate techniques of instruction with relevant educational methods								
3. Coordinate with programmed instruction production liaison assistant as well as faculty member. Evaluation of course effectiveness is required								
Add FTE's	1.0	100	1.0	100	2.0	200	2.0	200
Scope D								
1. Scope C	3.0	300	3.0	300	4.0	400	5.0	500
2. Offer short course in "Techniques of University-Level Instruction" to new faculty members								
3. Extend consulting service to computer assisted instruction								
Add FTE's	1.0	100	1.0	100	1.0	100	1.0	100
Total Scope D	4.0	400	4.0	400	5.0	500	6.0	600

[29] Merrill and Drob, op. cit., p. 15.

INTERNAL PLANNING AND ADMINISTRATION	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope A								
1. Manages Learning Resources Center that averages Scope A overall	2.0	610	3.0	700	3.0	700	4.0	1015
2. Provides secretarial assistance to all divisions of center.								
3. Seeks outside consultation on engineering and technical problems, as well as problems relating to budget, purchases, and accounts								
Scope B								
1. Scope A	2.0	610	3.0	700	3.0	700	4.0	1015
2. Manages Learning Resources Center that averages Scope B overall								
3. Coordinates engineering and technical development problems between divisions of center. Assists in design and planning of media use in new buildings								
Add FTE's	1.0	120	1.0	120	1.0	120	1.0	120

INTERNAL PLANNING AND ADMINISTRATION (continued)[30]	1000 Students		5000 Students		15,000 Students		27,500 Students	
	Staff	Space	Staff	Space	Staff	Space	Staff	Space
Scope C								
1. Scope B	3.0	730	4.0	820	4.0	820	5.0	1135
2. Coordinates business aspects of Learning Resources Center, including purchasing, accounting, and administration of research grants								
3. Manages Learning Resources Center that averages Scope C overall								
Add FTE's	2.0	210	2.0	210	2.0	210	2.0	210
Scope D								
1. Scope C	5.0	940	6.0	1030	6.0	1030	7.0	1345
2. Manages Learning Resources Center that averages Scope D overall								
3. Manages facilities of Learning Resources Center that can be decentralized for greater efficiency								
Add FTE's	2.0	210	2.0	210	3.0	300	3.0	300
Total Scope D	7.0	1150	8.0	1240	9.0	1330	10.0	1645

[30]Merrill and Drob, op. cit., p. 16.

A general policy of the program since its inception, has been to provide services to regularly scheduled classes at no cost to the academic department. An actual labor and materials charge is assessed for all services provided for non-classroom activities and for University Extension activities. Only actual material costs are charged academic departments and no labor assessment is made for regularly scheduled class resource production or utilization.

Qualifications and Responsibilities of Program Advisory Group and of Program Administrative and Staff Personnel: The program does not have a structured advisory board or council. Direct contact is made with faculty members, departments, or larger University academic units.

UCLA Academic Communications Facility Director has a doctorate and relevant administrative experience. He has an extensive background in all phases of instructional technology with a speciality in the area of instructional media. He has written extensively concerning a "teaching" technology. His major responsibility in addition to coordination of program services is to serve as liaison between the central administrative offices and University academic units.

The Assistant to the Director is a doctoral candidate in the field of educational technology. This position is in support of the program's chief officer and his administrative detail. The Director has a full time secretary and a office manager with clerical responsibility for Central Administration.

Coordinators are responsible for separate program sections: Audiovisual Services, Audiovisual Technical Service Shop, Graphics and Illustration, Instructional Media Library, Motion Picture Production, Research and Development, Specialized Stock and Store, Still Photography, Television Engineering, and Television Production. Each section is staffed with clerks and technicians. With the scope of services based on student enrollment formula, a realignment of staff is anticipated.

Specific Methods of Program Evaluation: Special logistical summation sheets are issued periodically to report specific divisional contributions for the UCLA Instructional Program. These academic support program contributions are submitted specifically to the Campus Planning Office as evaluative criteria.

At present no standard systematic evaluation procedure is evident. An accounting record is maintained concerning the number of equipment deliveries, production, and resource orders completed in support of academic units. An extensive computerized management application is currently being proposed and considered. This approach will completely systematize accountability of the programs amount of activity.

UCLA is currently among the more than 300 institutions of higher learning in the U. S. which are examining their goals and purposes.[31]

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[31]E. R. Hardwick, "Planning for the Future of UCLA," Jeff Weiner (ed.), "Daily Bruin Spectra," UCLA Daily Bruin, LXXIX (Los Angeles: The University of California, February 17, 1970), 6-7.

This activity suggests a most highly needed prerequisite to preceed the instruction design process. Nearly all institutions are finding their instructional methods and subsystems to be inadequate, restricted, unimaginative and crystallized. However, until the scope and sequence of the institutions purposes are defined, the process of instructional design will be stymied.

With this rationale consideration, this writer wishes to add an appendage to this UCLA academic support program case study. This case study addendum considers the scope and significant recommendation criteria which have been generated by the current activity of UCLA's Goal Committee.

One of the first priorities of the UCLA Goals Committee was to review and to analyze the nature of undergraduate education on the University of California's Los Angeles campus. E. R. Hardwick, chairman of the UCLA Goals Committee and Colin Young, chairman of the Goals Committee's Undergraduate Education Subcommittee, express some undesirable features of the undergraduate educational programs at UCLA:

> The impersonalism of large introductory or survey courses in subjects required for "breadth" or preparation for the major, which are often taught by inexperienced junior faculty or teaching assistants.
>
> Rote learning in many introductory courses, with little opportunity for direct participation by students. A corollary of this is that the "best" students in California are thus being told they must wait till the graduate level for a chance to do individual work.
>
> The approach of most departments, who accept beginning students as freshmen or juniors and then feed them through a pipe to an advanced degree without ever requiring or encouraging them to discover the connection between their studies and the work in other fields.

> The fact that curricula seem often to be established and conducted on a basis which is of more convenience for teaching than for learning. This reinforces the students' suspicion that faculty consider them little more than a necessary evil to support the faculty in their real interest, which is research or graduate teaching.
>
> The locked-in systems of prerequisities and sequential courses which often permit very little room for individual initiative.
>
> The grading system, which is cumbersome for the faculty to administer (and is often handled by teaching assistants) and which imposes great strain on students without providing reliable and precise evaluation in all the courses they take.
>
> The unfortunate dependence of undergraduate curricula on graduate studies, which weakens the possibility of designing independent undergraduate programs or of treating the four years of undergraduate education as a self-contained program. Since about 50 per cent of undergraduates here do not go on to graduate school, this control and influence by graduate programs seems clearly disproportionate.
>
> The fact that much work in American studies in the humanities, social sciences, and the arts ignores sinificant reference to minority cultures.
>
> The distance which seems to separate departmental programs from each other and from the real world. This is of increasing concern to students, who belong to a generation that thinks of the university as a staging ground for social change rather than a retreat.[32]

Larry Weinstein, member of the UCLA Goals Committee, chairman of its Student-Committee on Campus Community and chairman of the Student Educational Policy Commission, extends criteria of a possible solution and seven specific recommendations:

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[32]E. R. Hardwick and Colin Young, "Undergraduate Education: It's Gotta Change--Undergraduate Education at UCLA," Jeff Weiner (ed.), "Daily Bruin Spectra," UCLA Daily Bruin, LXXIX (Los Angeles: The University of California at Los Angeles, February 17, 1970), 5.

I have argued that knowledge itself is not power, and that significant learning involves not merely the retention of knowledge but also the application of knowledge to the conduct of one's own life. Implied in what I have said is the responsibility of the university to encourage the personal use of knowledge. Any number of specific recommendations for reform of the undergraduate education experience might logically follow from this premise. Below, I have listed a few possibilities:

1. Encourage students, beginning at an early point of their college experience, to question the uses of knowledge to themselves. The occasion of such questioning might take the form of an expanded and improved version of the current Freshman Program, one quarter of which would deal with learning in general and one quarter of which would deal with learning at the university in particular. It might also take the form of groupings of students meeting together informally, perhaps with a professor, throughout their undergraduate years.

2. Create opportunities for students to put knowledge into their own terms--orally, in writing, and by other expressive modes. Seminars are often excellent opportunities for students to test out their own ideas on the subject matter of a course and to evolve new conclusions. (Faculty time can be freed for the offering of seminars by changing the course load and by reducing the frequency of middle-sized lecture offerings. And a very large number of undergraduate seminars can be established by arranging with students who have already completed a course and who have done well in it to lead seminar sections of it for special credit.) In addition, a rule providing that instructors offer students alternative criteria for evaluation may serve to accomodate other, nonverbal modes of expression.

3. Have professors become living models of the possible uses of knowledge, rather than mere communicators of knowledge. Students can obtain facts at least as effectively from written material as from lecture. A professor's time in class would be spent well to reveal what only humans can--how knowlege applies. A series of courses might be established in each department which are designed to engage students in professors' current research.

4. Seek to effect a continuum between the formal education provided by the University and student life by campus living groups. A course of study is justified if it applies to the conduct of life and not merely to itself; action must be taken to obscure the division between truths of the classroom and

truths of informal campus life. Students might share their personal expressions on the issues of a course with the general campus community by displaying them in the Sculpture Garden or elsewhere on campus, by distributing them or by performing them. Curricular programs might be set up which are based partially or entirely in campus living groups.

5. Offer alternative curricula designed to accomodate the diversity of uses for knowledge that is represented by the student body. These might include: the combination of discrete breadth and specialization experiences that is common now; a two-year, inter-disciplinary, problem-oriented program, in lieu of discrete breadth courses; a Bachelor of Arts in Liberal Studies; and programs consisting of no requirements whatsoever, a student's continuance being subject only to the periodic approval of an advisor.

6. Permit students to exercise their understandings of experience through activities which are non-academic. An office might be established which would maintain liaison with selected businesses and community projects, and which would arrange for students working in them to recieve credit.

7. Eliminate evaluation systems which reward the retention of knowledge and not the personal use of knowledge. Letter grades, which by their very nature tend to reduce the work of all students to a single standard, must go. If at all possible, they should be replaced by written evaluations.

8. Enable instructors to regularly consider better means of fostering learning that is "powerful." Criteria for tenure and promotion must be introduced which do not penalize the professor who devotes time to his teaching role. Opportunities should exist for instructors to share ideas about teaching and to become aware of the relevant ideas of educators.[33]

If institutions of higher learning have clearly defined purposes and priorities, curricula development may proceed with scope and se-

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[33]Larry Weinstein, "Undergraduate Education: It's Gotta Change--The Powerlessness of a UCLA Student," Jeff Weiner (ed.), "Daily Bruin Spectra," UCLA Daily Bruin, LXXIX (Los Angeles: The University of California at Los Angeles, February 17, 1970), 7-8.

quence of curricula. This criteria development will provide a major prerequisite in rationale development for instructional design programs in institutions of higher education.

University of California
Berkeley

A major percentage of the information presented in the UCLA academic support program case study which precedes this section has an applicability to this University of California at Berkeley academic support program case study. "Criteria for Planning the University Learning Resources Center"[34] cited in the UCLA program case study is a suggested coordination of instructional design services for the nine Universities of California campus system. Both campuses, Los Angeles and Berkeley, are in the University system.

The Program Title, Purposes, and Priorities: During March 1966, the Office of Educational Development was established by the Academic Senate, Berkeley Division. When the Office was approved, the Board of Educational Development was created, consisting of six appointed members who serve three-year staggered terms, and the campus-wide administrative officer most responsible for education. This improvement of instruction-oriented Board has the following responsibilities:

> 1. To stimulate and promote experimentation in all sectors of the Berkeley campus, and to support innovation wherever it is needed; to sponsor, conduct, and direct, with use of an Office of Educational Development, continuing studies of the needs and opportunities for educational development; and to maintain liaison with the Committee on Courses of Instruction, Committee on Educational Policy, Graduate Council, and the executive committees of the colleges and schools, on matters of educational effectiveness, innovation, and for the initiation of experimental courses, programs and curricula.

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[34] Merrill and Drob., op. cit.

> 2. To receive, encourage, and authorize experimental instructional proposals for which neither departmental nor college support is appropriate or feasible; to initiate and administer such experimental instructional programs pending their adoption by a department or other recognized faculty group, for a period not to exceed five years, subject to policies prescribed by the Berkeley Division; and to provide all possible accessory services for experimental programs initiated within departments, schools, and colleges.
>
> 3. To initiate and sponsor the securing of extramural funds for the support of experimental courses and curricula, and to administer such funds for this purpose as may be allocated to the Board or to the Office of Educational Development.[35]

The Berkeley campus has a Media Center from which a variety of equipment and operators can be rented by the academic departments. Little, if any, emphasis has been placed upon the development of a strong centralized academic support program with instructional design services at Berkeley. University academic units have remained totally independent and fully autonomous in nature.

In the past, a great deal of resistance has been prevalent for the initiation of any centralized agency "at the expense" of the ultra-powerful academic units. Generally an assumption has been expressed by these academic units that "Berkeley has emerged as one of the leading intellectual centers of the world. This hard-won and enviable position can be attributed to the progressive and cumulative efforts of a variety

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[35]Select Committee on Education. "By-Law 15" Academic Senate, Berkeley Division (Berkeley: University of California, March 31, 1966).

of factors (including). . .a favorable climate. . .a preeminent faculty. . ."[36]

The total instructional resources and related technology are the concern of several committees of the Berkeley Division of the Academic Senate, the deans of academic units, and the Office of the Chancellor. Several academic units have built small, inadequate non-integrated instructional resource collections. Equipment and some production support may be rented from the Media Center or Photographic Services. Photographic Services, also a self-supporting agency, promotes "Microfilm, Photograph, Photostat, Lantern Slide Services."

Equipment and material rental and production services are expensive in comparison with commercial rates because all labor and material costs must be assessed when the self-supporting basis of operation is considered. This writer assumes from a personal visitation to the Berkeley campus and from Academic Senate reports that an anti-technology attitude permeates the Berkeley campus.

Priorities of the Board of Educational Development have centralized in four areas: 1) Special programs stressing the activity of learning; 2) New introductory, breadth, and non-departmental courses; 3) Interdisciplinary and University courses; and 4) Integration of curricula.

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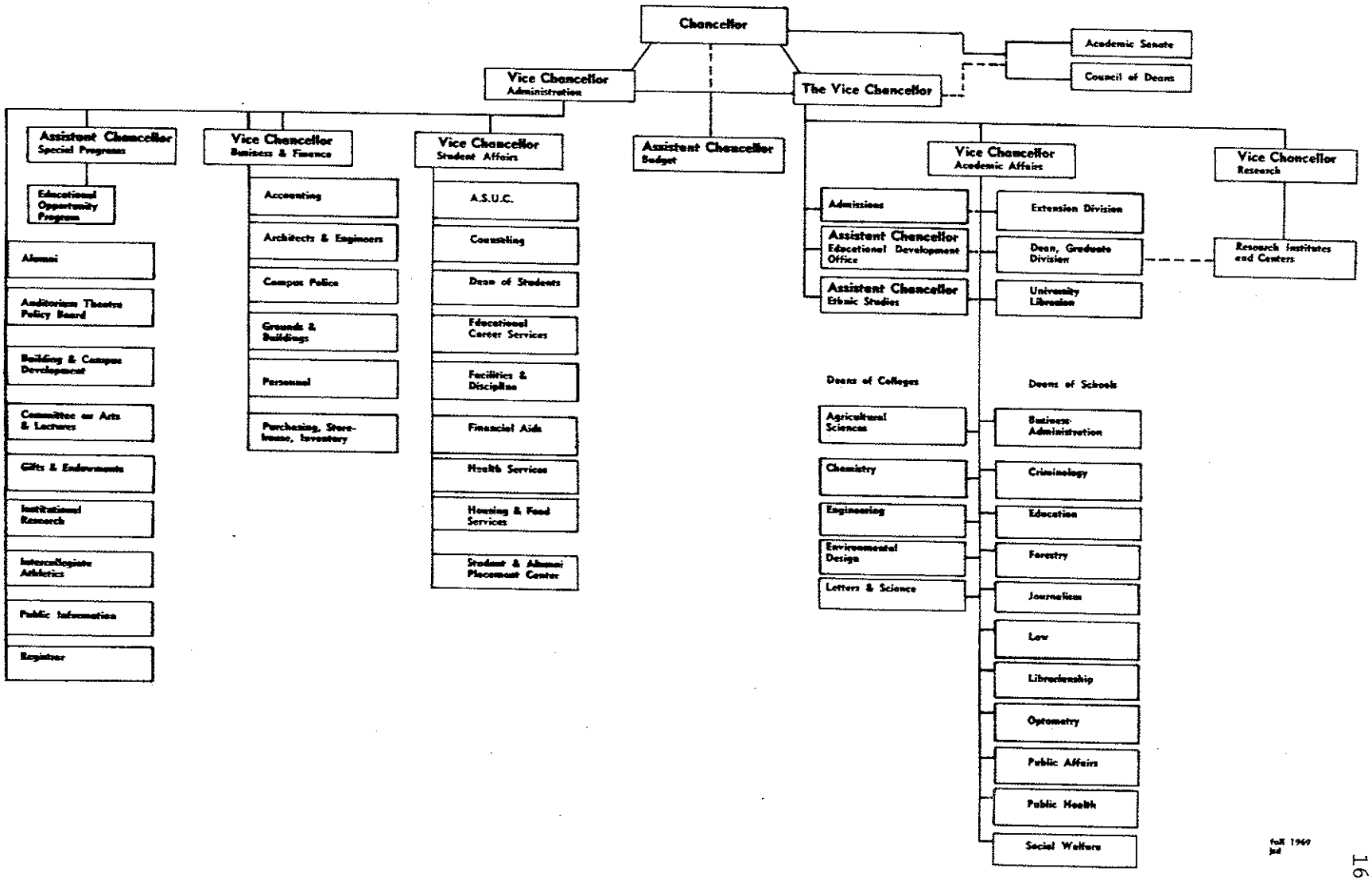
[36]George C. Pimentel, "Addendum - A Minority Report" Charles Muscatine, et. al. Education at Berkeley - "The Muscatine Report," (Berkeley and Los Angeles: University of California Press, 1968), p. 197.

ADMINISTRATIVE ORGANIZATION, BERKELEY CAMPUS, UNIVERSITY OF CALIFORNIA



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Administrative Structure of the Program with Relationship to the University's Chief Academic Officer: The Office of Educational Development is structured under a specially designated Vice Chancellor for Educational Development. This position is placed at a level equal to or above the Vice Chancellor for Academic Affairs and is in direct line to the principal campus officer, the Chancellor.

Qualifications and Responsibilities of Program Advisory Group of Program Administrative and Staff Personnel: The Board of Educational Development, with the Assistant Chancellor for Educational Development, in essence constitute the Office of Educational Development. This Board represents the entire faculty interest in educational development, and it promotes special contacts and *esprit de corps* among faculty volunteers who are most actively engaged in educational innovations. The Board also ensures that the Office of Educational Development policies are effectively pursued, and that new programs will find adequate support through the participation, *ex officio*, of the Assistant Chancellor for Educational Development.

When the Office of Educational Development was initiated, six members were appointed to serve on the Board for three-year staggered terms by the Committee on Committees. After the first year of operation, two faculty members are appointed each year. Selection of Board members is made from faculty members who combine the highest scholarly attainments with a demonstrated concern for educational development.

The Assistant Chancellor for Educational Development is an *ex officio* member of the Board, and has voting rights. His responsibilities include:

> 1. Administer the policies and programs of the Board of Educational Development.
>
> 2. Consult with all appropriate members of the academic community concerning deficiencies in or possible development of existing offerings, and encourage new offerings where they are considered necessary.
>
> 3. Consult with Deans and Departmental Chairmen concerning desirable recruitments and promotions conducive to campus educational development.
>
> 4. Provide general administrative and incidental assistance to studies and experimental programs.
>
> 5. Secure funds for these purposes from private, foundation, University, and government sources.[37]

Special Methods of Program Evaluation: When the Board of Educational Development was created with the Academic Senate approval and enactment of By-Law 15 of the Berkeley Division, a systematic method of program evaluation was included: "That in the sixth year of the Board of Educational Development's operation, (1971), the Committee on Committees shall appoint an *ad hoc* committee, to examine the extent and effectiveness of the Board's activities, to recommend changes in its structure if needed, and to report to the Division during that year (1971)."

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Florida State University

The Program Title, Purposes, and Priorities: The Division of Instructional Research and Service (DIRS) was initiated July 1, 1968 by the Florida State University Administration with the approval of the Florida State Board of Regents.

The purpose of the Division is to assist with qualitative development of the University's program of instruction and to promote the University's teaching-learning priority. Division assistance is provided in two forms: 1) services ranging from test scoring to the provision of facilities and personnel to assist in the production of instructional television programs and 2) research, development, and evaluative studies concerning the instructional programs of Florida State University.[38]

The Division maintains a central office which defines Division objectives, coordinates five intregal sections, and systematically evaluates the Division effectiveness. DIRS central office conducts intensive in-depth evaluations of University academic units at their request. This evaluative process is designed to analyze all aspects of current academic departmental operations. The office also develops long-range plans related to departmental personnel, programs, and budgets.

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[38]Division of Instructional Research and Service, Notes From DIRS, I (Tallahassee: Florida State University, September, 1968), 1.

With the advancement of major developments and innovations in learning procedures and educational technology, the Office also serves as a clearing-house for these developments. Notes From DIRS is published periodically to disseminate information of noteworthy, on-campus educational development projects.

As an academic support coordination agency, the DIRS central office has integrated five University service sections. These sections are: 1) Media Center (formerly the Educational Media Center), 2) Office of Evaluative Services (formerly the University Testing Service), 3) Research and Development Center (formerly a section of the Institute of Human Learning), 4) Computer-Assisted Instruction Center (formerly a section of the Institute of Human Learning), and 5) Center for Research in College Instruction (formerly a unit of the Graduate School). See following page which charts the personnel positions with liaison, identifies the five Division service sections, and defines directorate and service unit functions.

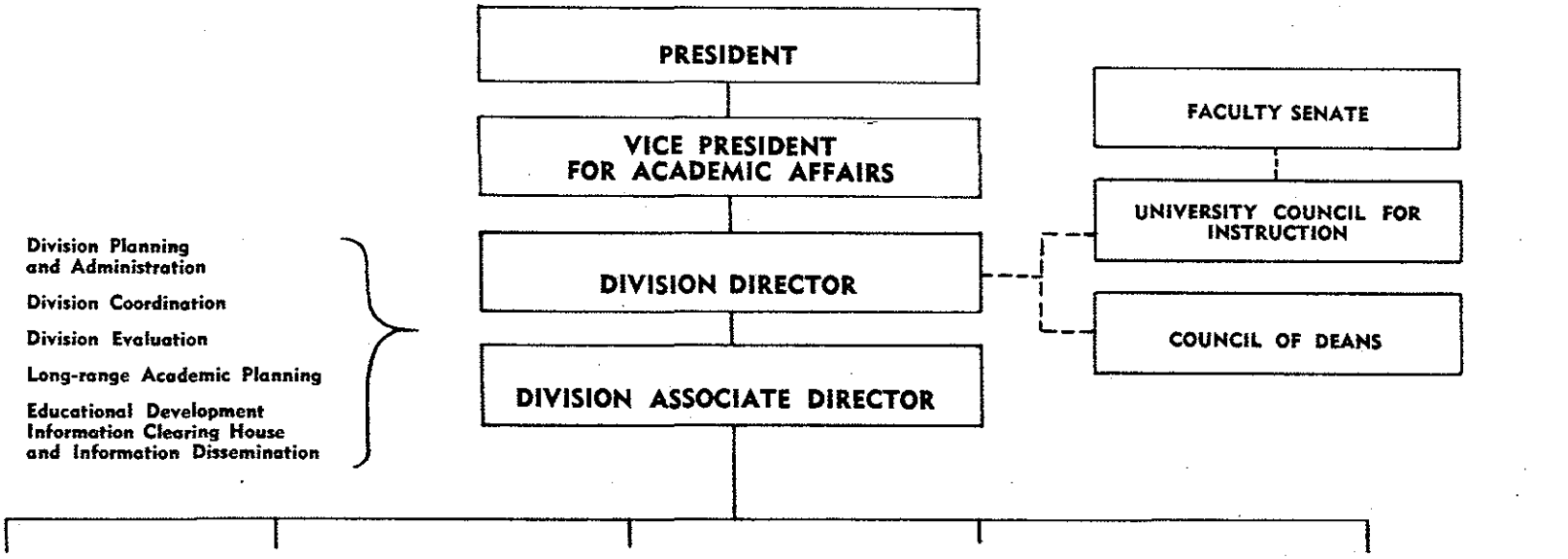
The Media Center is an integral section of the University academic program as served by DIRS. Five units are maintained at the Media Center. These units include: 1) Campus Services, 2) Center Facilities, 3) Graphic and Photographic Services, 4) Instructional Television, and 5) Instructional and Advisory Services. A seventh unit, Cinematography, has not been operational, but plans indicate that this unit will be reactivated when funds are available to provide film production capability for interested departments.

Campus Services provides all types of audiovisual equipment and educational films for regularly scheduled University resident classes without charge. An extensive 16mm film collection of 5,000 titles is available for resident, regularly scheduled class utilization. All films may also be rented by non-University patrons. This external revenue permits the Media Center to acquire an extensive variety of commercially produced titles. No priorities are placed on these films, but academic units or non-University patrons are served on a first booking basis. Film titles which are not included in the Center's collection may be obtained on a rental basis from off-campus sources by the academic departments submitting a recharge requisition to the Center; available projectionists and audio technicians are provided on request. Audio tape and video tape stock with duplication facility services are also available. A campus delivery service is continuously provided and supplements equipment sub-centers which are established in several campus buildings.

Center Facilities include previewing rooms, independent study, carrels, dial access listening stations, and media reference services. A complete maintenance and repair shop provides services including instructional equipment design and construction.

Graphic and Photographic Services provides illustration, graphic creations and still photographic materials. The photographic laboratory is available for faculty utilization. Photographic slides, transparencies, glossy prints, positives, and other photographic materials are processed in the photographic labs.

FLORIDA STATE UNIVERSITY
DIVISION OF INSTRUCTIONAL RESEARCH AND SERVICE



MEDIA CENTER
DIRECTOR

- Campus Services
- Center Facilities
- Graphic and Photographic Services
- Instructional Television
- Instructional and Advisory Services

OFFICE OF EVALUATION SERVICES
DIRECTOR

- Test Scoring and Analysis
- Test Supervision and Administration
- Basic and Applied Evaluation Research
- Faculty Consultation and Advisory Service

RESEARCH AND DEVELOPMENT CENTER
DIRECTOR

- Academic Consultation Services
- Curricula Development and Design Assistance
- Educational Development Evaluation
- Faculty Seminar and Workshop In-Service Instruction

COMPUTER ASSISTED INSTRUCTIONAL CENTER
DIRECTOR

- Computer Assisted Instructional Research
- Computer Assisted Instructional Development
- Faculty Computer Instruction and Advisory

CENTER FOR RESEARCH IN COLLEGE INSTRUCTION
DIRECTOR

- Science and Mathematics Discipline Investigation
- Development Services
- Dissemination Services
- Interdisciplinary Coordination

Instructional Television provides studio production with instructional materials, development services, portable videotape recording equipment, and closed circuit system dissemination. Departments purchase videotape stock supplies.

Instructional and Advisory Services presents faculty or student workshops for equipment operation, transparency production, or other phases of instructional media. This unit extends special media implementation consultation. Media reference and evaluation services and indexes are available also. Advisory services for equipment selection and utilization are provided.

The Office of Evaluation Services: primary function is to assist the faculty members in evaluation which is related to their instruction. While this is most often accomplished through individual conferences with faculty members, the Office will hold occasional small conferences of faculty members who are concerned about similar evaluation problems.

The Office of Evaluation Services offers a test scoring and analysis service. Multiple choice classroom tests that have been processed on IBM answer sheets are scored at no cost to the faculty member or department. Answer sheets are furnished at no cost for such purposes. Scoring is prompt, although scoring needs for large classes are scheduled by special arrangement with the Office during the rush periods of midterms and final examinations. Item analyses are done without cost. The current analysis program yields information about how many students choose each response, how difficult each item is, and how well it dis-

criminates between those who score high and those who score low on the total test.

Test scoring is also available for research projects; however, a labor, equipment, and supplies charge is assessed.

The Office also administers admissions tests for entry into college and into graduate school. It supervises administration of foreign language tests and orientation tests, and assists national testing agencies in administration of their programs locally.

In addition to assisting other sections of DIRS with the measurement and evaluation aspects of research, the Office of Evaluation Services conducts basic and applied research on measurement problems associated with instruction.

The Office is prepared to assist faculty members and departments with the development of aptitude, admission, and placement examinations and the evaluation of those which are currently being used.

The Research and Development Center has two broad objectives: 1) to provide consultation services and technical support to departments and individual faculty members for the purpose of revising and improving curricular offerings and instructional practices, and 2) to study the educational development of students in terms of motivation, attitudes, and values as they are affected by experimental programs as well as by the impact of the University at large.

The members of the Research and Development Center are prepared to offer assistance in a variety of areas. These include clarifying and writing instructional objectives, programming instructional materials,

developing teaching strategies, and designing instructional sequences. As a result of inquiry into these various aspects of instructional planning, elements of the teaching-learning process can be brought into clearer focus and decisions can be made which may increase efficient use of instructor time as well as maintaining and enhancing student learning. See Florida State University Research and Developmental Model for Instruction Design on the following page.

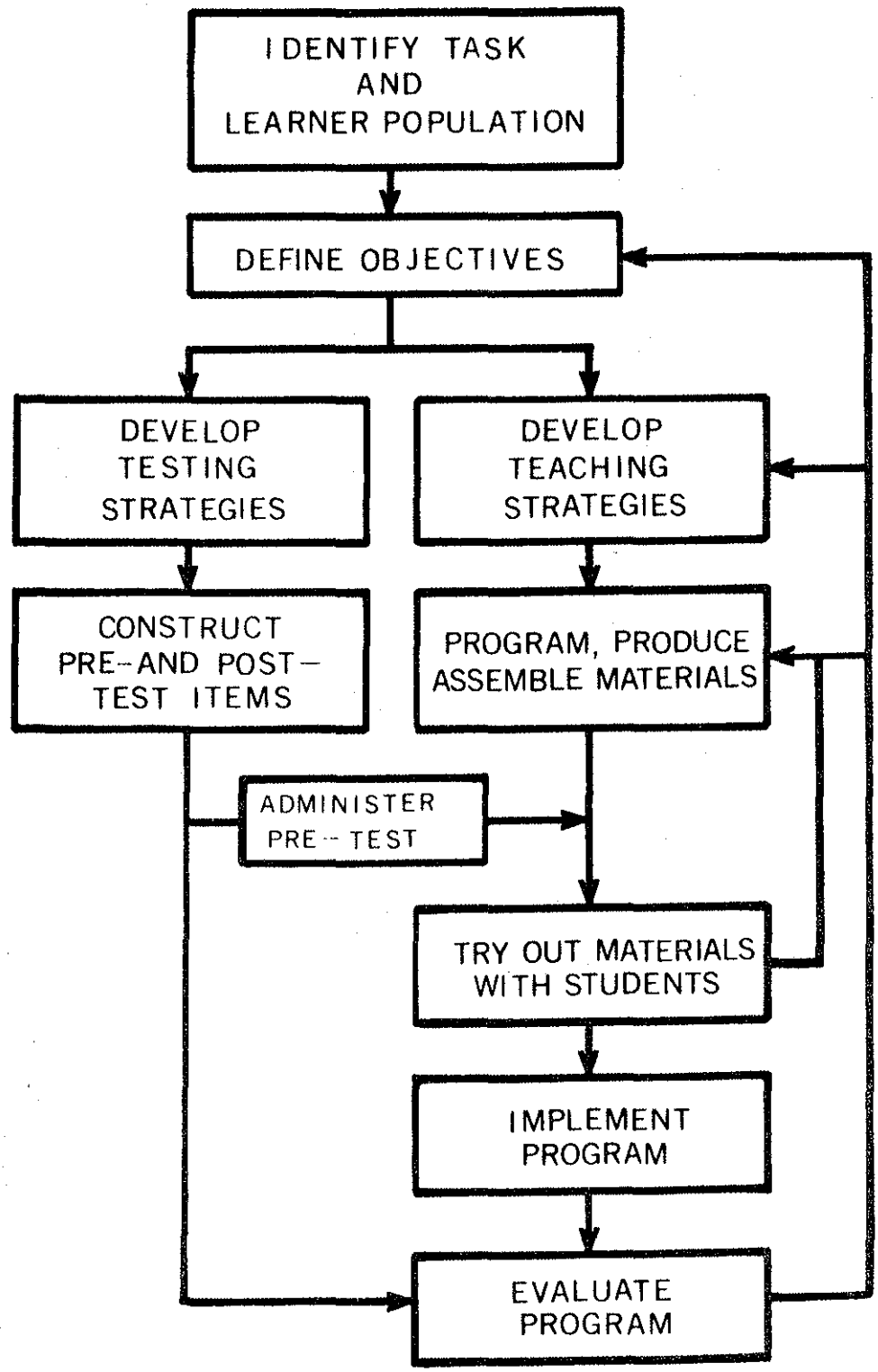
The second general objective of the R & D Center is the study of the impact of particular college experiences upon the attitudes and values of the student body.

Members of the Center staff are currently involved in studying the informal aspects of student life and the impact of experimental efforts, such as the Cluster Program and the Freshman Learning Experiment (FLEX), to determine their effectiveness as procedures for realizing desirable intellectual and attitudinal goals in higher education.

Research and Development Center personnel are providing presentation of seminar/workshops to small groups of interested faculty members in the area of programmed instruction; consultation services to departments for establishing and maintaining programs for more effective training of graduate teaching assistants; and technical assistance in the planning and use of simulation techniques in the laboratory or classroom.

The Computer-Assisted Instruction Center is a research and development laboratory dedicated to investigating the possible roles of computer in instructional processes. Computer-assisted instruction is

RESEARCH AND DEVELOPMENT MODEL FOR INSTRUCTIONAL DESIGN



the presentation of instructional material under computer control via various technological devices such as automated typewriters, video screens, and film projectors. A broad range of problems is currently being investigated at the Center. The role of problem-solving and review instruction as it effects test performance is being studied. The CAI Center is providing complete tutorial instruction in an attempt to learn how best to organize an autonomous non-conventional curriculum. Projects have been initiated on computer-managed instruction in which the computer monitors the progress of students through more conventional but segmented learning units. The computer equipment is being utilized to study sophisticated forms of testing and evaluation. The CAI Center is sponsoring a number of basic research topics relating to the role of the learner within a complex and highly flexible instructional sequence.

The CAI Center is supported mainly by funds provided by external grants and contracts for research, devolopment, and training projects. Faculty members are encouraged to undertake instructional projects with the Center, but it is not now able to provide computer facilities and time on a no-cost basis in the amount which would be needed for routine instruction of students.

The Florida State University serves as the host institution for the Center for Research in College Instruction of Science and Mathematics (CRICISAM). The staff is available to the faculties of the several institutions which founded the Center.

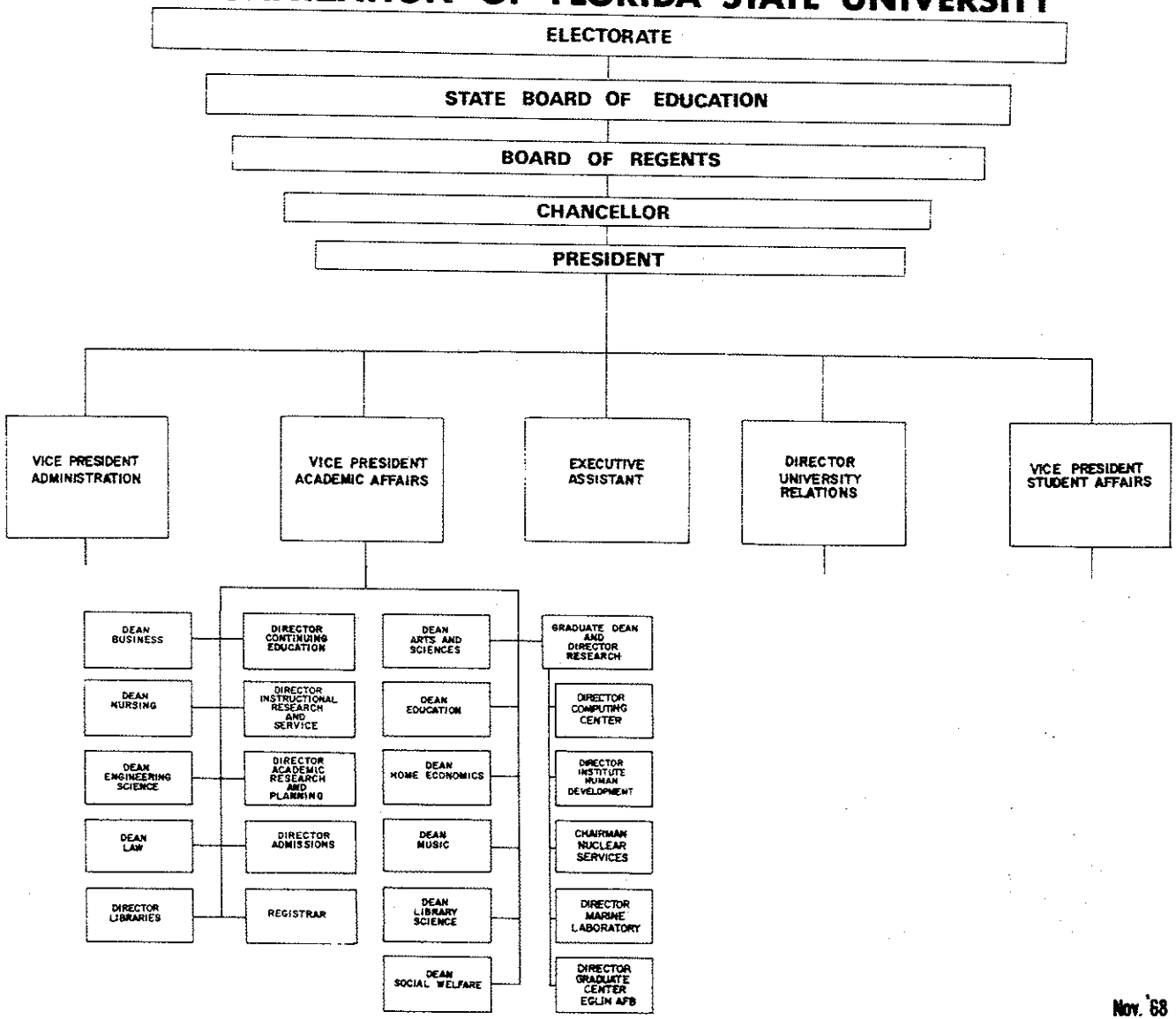
This Center provides services for the investigation, development, and dissemination of new materials and techniques of collegiate instruc-

tion in the various fields of science and mathematics with emphasis on interdisciplinary cooperation.

Concerning Division priorities, all services and research are provided on an "as needed and as requested" basis. A fundamental working principle of the Division is that assistance is provided only upon request. No general responsibility has been charged the Division other than that of being a catalytic agency to assist individual faculty members, departments, or divisions. The major Division goal is to work cooperatively with others toward instructional improvement. All efforts of the Division are in cooperation with faculty members and all projects must be sanctioned by the administrative unit for which the work is done. All instructional design is completed with the premise that decisions about curricula development, content, evaluation, and grading procedures are the exclusive right of the faculty members in the academic units. Although the Division assists in the design of learning (i.e.: defining objectives, arranging course content, developing or selecting resources, and developing evaluation procedures), the final responsibility and authority rests with the faculty member.

Administrative Structure of the Program with Relationship to the University's Chief Academic Officer: The Director of DIRS reports directly to the Vice President for Academic Affairs. DIRS is an independent division of the University. See the following page for Florida State University organizational chart with the Vice President for Academic Affairs relationship with DIRS.

ORGANIZATION OF FLORIDA STATE UNIVERSITY



Nov. '68

Qualifications and Responsibilities of Program Advisory Group and of Program Administrative and Staff Personnel: The University Council for Instruction serves in the advisory group capacity to the Division of Instructional Research and Services. Members of this University Council for Instruction are selected by the Faculty Senate. Selection criteria include faculty members with highest scholarly attainments and a demonstrated concern for the improvement of learning at the University. The major responsibilities of this advisory Council are policy definition and periodic review of the Division's total operation.

The DIRS Director has a doctorate, professorial status, relevant administrative experience, and extensive experience in the areas of research, teaching, psychology, and educational technology with media. He serves on the Council of Deans at the University. He is mainly responsible to coordinate all services with personnel and to act in a liaison capacity with the central Administration, Council of Deans, and the University Council for Instruction.

The Division's Director and Assistant Director have similar qualifications. Their major responsibilities are in the areas of research and program coordination.

The Research and Development personnel have expertise in the areas of educational psychology, instructional design, and media application. All members of this Division section have doctorates and an extensive amount of experience in their respective areas. Learning-teaching research and educational design and development consultation services are the major responsibilities of this group.

The Media Center Director has an advanced degree in Library Sciences. His major responsibilities include sectional administrative coordination and faculty consultation. The Office of Evaluation Services is administered by a doctorate with educational psychology and measurement expertise. He is responsible for section coordination and liaison with the Division. With a doctorate in the field of computer science, the Computer-Assisted Instruction Center Director coordinates the unit, consults with faculty, and is liaison officer with the Division.

The Director of the Center for Research in College Instruction of Science and Mathematics has a doctorate. He provides administrative coordination for this unit at Florida State University and fifteen other major institutions in the Southeast. He interacts with other Division sections in a developmental effort of resources for science and mathematics instruction in higher education.

Specific Methods of Program Evaluation: Periodically the academic units of the University are systematically surveyed to obtain evaluative input concerning the University instructional program in conjunction with departments and divisions. The Central Office of DIRS strives to be sensitive and responsive to comments and suggestions by faculty members about improvement criteria for the University instructional programs, how instructional facilities can be extended, and how the instructional program can be improved by DIRS and other supporting divisions of the University. Division reports are submitted to the Vice President of

Academic Affairs, the Council of Deans, and the University Council for Instruction.

CHAPTER IV

FINDING AND ANALYSIS

All six of the universities which were included on the visitation itinerary are challenged with academic oriented problems. F. Craig Johnson has identified major problems in a research project entitled An Evaluation of Educational Development Programs in Higher Education. The academic problems which he identifies include: (1) academic planning and its relationship to the university budgeting procedures, (2) the interaction of the university with the state legislature, (3) the development of a unique character for the university as it maintains quality, (4) student demands for societal relevance, and (5) the need for faculty to define the curriculum in terms of a major university in our society.[1]

All interviewed university executive administrators agreed that these are major problems. Each of the six institutions has implemented or is actively engaged with proposing a total-university academic assistance, service, communication, and stimulation program.

A general concern was expressed at all six universities that the process of instructional design (the encoding of course goals and

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[1] Craig, F. Johnson, An Evaluation of Educational Development Programs in Higher Education, U.S. Office of Education Project No. 7-E-114, Grant No. OEG-0-8-070114-1856(010) (East Lansing, Michigan: Michigan State University, 1968).

objectives, the implementation of learning resources, and course evaluation) must be actively integrated with the total-university educational development procedure. To express this rationale simply, the writer makes the following comparisons: since instructional resources may not be justified in isolation without integration in the total learning design process, the learning design procedures can not be entirely justified as a discrete procedure in the total process of educational development. The total educational development process, as a system, has three distinctive functions: (1) determination of educational curricula goals and priorities, (2) planning of curricula design (instructional design), and (3) classroom implementation.[2] This final process (classroom implementation) must determine learner mastery achievement levels. The third section should serve as an evaluative function for the total educational development procedure. The second section, instructional design, can be defined as a sub-system which is integral with the larger total system, educational development. To encourage modification and to achieve dynamic qualities, the educational development process must be approached systematically.

Five of the six university academic programs were structured systematically. The one program proposal which was without the systems

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[2]Robert Heinich, The Systems Engineering of Education II: Application of Systems Thinking to Instruction, A monograph prepared for the Instructional Technology and Media Project (Los Angeles: University of Southern California, School of Education, 1965).

approach design had not been implemented. This proposal was completed in 1967 at the request of the university's provost office, but the priority of the program had not been sufficiently high for the proposed program's implementation.

Program Titles and Purposes

The academic support described in Chapter III can be generally classified in three major categories: educational development, instructional research and services, and instructional resources production and dissemination.

Two of the selected institutions had clearly established educational development programs. Two offices of instructional resources were in proposal stages. Two of the six selected universities had fully implemented divisions of instructional research and services. Program title analysis reveals the following actual terminology count: "Educational Development" (two), "Instructional Services" (four), "Learning Resources" (three), and "Academic Communications" (one). Specific titles connote varying program purposes and functions. During the writer's course of program visitations, vice presidents or program directors indicated that the specific titles were selected not necessarily for expression of program purposes and functions, but rather for academic community acceptance. Several of the program directors told that the word "educational" was necessarily deleted from the title because a possible total-university misconception might develop that the program could serve only the college of education.

The two selected programs with "educational development" titles had the following purposes:

> To assist and to motivate education change as a catalytic agent for the instructional development and implementation of a set of educational principles and procedures to preserve and to improve education at the University.

These educational development programs were to assist faculty in the areas of curriculum analysis and development, learning-teaching research and services, and liaison communication between faculty and administration.

The programs which were designed to coordinate academic support sections and facilitate a means for the academic community to solve problems had the following purpose statements:

> Assist the improvement of instruction by providing professional guidance and technical assistance.
>
> Expedite services to faculty with the assistance for financial proposal writing.
>
> Provide instructional services to the academic community.
>
> Qualitative development of instruction in the areas of services, learning research with development, and evaluation.

One proposed office and two proposed centers of instructional resources proposed to support resident instruction and to provide assistance for the increased use of newer techniques and resources.

The titles of these programs were: Educational Development Program with Educational Development Services, Division of Instructional Services, Office of Learning Resources (proposed), University Learning Resources Center (proposed), Academic Communications Facility, Office

of Educational Development, and Division of Instructional Research and Service.

Program Priorities

Concerning the priorities of each of the selected programs, the directors were asked to respond to predetermined criteria of program priorities. The basis for these criteria was stimulated by the Michigan State University Educational Development Program Report.[3] They were developed to assist in placing the instructional design process into perspective. The directors' ratings of academic support program priorities placement are listed in Table XI. All directors emphasized that media resources cannot be totally justified as the only element in the instructional design process. Three directors commented that the rationale of placing the instructional design process as the single element in the total improvement or development of instruction criteria is likewise marginal. Learning resources are an integral part of the total instructional design process (i.e., learning objective design, learning resource implementation, and learner evaluation). The instructional design procedure is also an integral element in the total educational process (i.e., curriculum determination, instructional design, and learner performance validation).[4]

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[3]Johnson, loc. cit.

[4]Heinich, loc. cit.

TABLE XI

ACADEMIC SUPPORT PROGRAM PRIORITIES PLACEMENT OF TWO EDUCATIONAL DEVELOPMENT PROGRAMS, TWO OFFICES OF INSTRUCTIONAL RESOURCES, AND TWO INSTRUCTIONAL RESEARCH AND SERVICES DIVISIONS RANKED BY PROGRAM DIRECTORS, SPRING, 1970

Priorities	EDP	OIR	IRS	Average of the Six
To identify academic problems	1 2	3 3	3 4	2
To stimulate and conduct learning research	2 1	2 4	4 3	2
To improve instruction	3 3	1 2	1 1	1
To provide learning design services	4 5	4 1	2 2	3
To disseminate learning resources	5 6	5 5	6 6	4
To communicate progress in learning research, experimentation, and implementation	6 4	6 6	5 5	5

The more sophisticated programs are recognizing the importance of integrating curriculum development assistance into their total scope of priorities. Other selected programs which are structured to assist with instructional design services and resource dissemination appear to be placing a greater emphasis in the educational development priority in 1970 than Johnson found in a 1967 sampling.[5]

[5]Johnson, op. cit., p. 12.

The ranking and categorizing of program priorities have varied with the individual conceptualization of the total program scope. Each director has developed his own approach for the improvement of learning.

A major priority was identifiable in all of the selected programs. A major priority in all the selected programs emphasizes the responsibility of the programs to maintain a catalytic nature. A fundamental working principle of all six selected programs is to provide assistance only upon faculty or administrative request. The philosophy is that the autonomy of both the faculty and administration must continue. Faculty members are charged with the responsibility for actually programming the instructional-learning process, and the central administration is responsible for allocation of funds for the academic personnel, resources, and facilities. The catalytic aim is to assist those who are responsible to be able to function to the fullest extent of their potentiality.

Other program priorities include academic recognition and emphasis; liaison communication between faculty ranks and administrative levels; development of an academic long-range objective; curriculum definition and development of instructional improvement through discretionary funds with a grant foundation to encourage faculty proposals; and regular university policies of continued funding for successful educational development projects.

Program Placement in the Total University Organizational Structure

All six of the selected programs were structured and organized directly under the university chief academic officer. This chief academic officer of each campus or state resident instructional system usually had a council of deans report to him and served as an advisory for the chief executive university officer (the president or chancellor).

Two of the selected programs which had their directors serve as the chief academic officer had broadened priorities which related directly to educational development (curriculum scope and sequence). The other four selected programs, with their directors reporting to or advising the chief academic officers, were more concerned with the priority of instructional design services.

Program Advisory

A variety of advisory input levels influenced the six selected programs. One advisory board operated as the office of educational development. This board functioned as an advisory, policy-development unit with the program director serving as the vice-president of educational development. Another educational development program shared the director with the office of the provost, but no specific advisory group had been designated for program development. The program's administrative staff interacted directly with the academic senate and the committee on committees. During the writer's visitation at this program, several administrators suggested the need for an advisory

group specifically established for the program's continued support and quality. The program's university funding source had recently restricted program financial support.

In a program proposal at one of the six selected institutions, an office advisory council was suggested for the program's services sub-division with an additional advisory council for the research and development sub-division. Three of the selected programs had no advisory groups specifically structured for the program. However, their directors could serve on presently established university academic related groups. If the program directors are elected to serve on these high level faculty committees, less need may be prevalent for a formally structured program advisory group. One program was almost completely operating without faculty or central administrative involvement. Long-range advisory group planning development appeared to be absent in four of the six selected programs.

Qualifications and Responsibilities of Program Administration

All of the program directors with one exception had doctorates with specializations in the areas of administration, educational research, educational psychology, instructional communications, and educational measurement and evaluation. All of the program directors had an extensive amount of experience in educational technology. Two of the directors had central executive administrative status in addition to professorial rank and three of the program directors had professorial

rank with tenured positions. All of the program directors had more extensive educational technology specialization and experience than their executive administrative superiors. These directors ranged from 40 to 60 years of age, and had worked extensively on higher educational levels.

Each program assistant director had generally equivalent educational technology specialization to that of the program directors'. Most of the assistant directors were about 35 years of age, had recently earned doctorates, and did not necessarily have extensive experience background in the total instructional design process. All had worked in higher education with teaching-learning in the arts and humanities disciplines.

Major responsibilities of the program director and his assistant were: program liaison communication; program budget development and review; proposal requests for funds from private foundations and government sources; service policy development; program personnel management; learning research design and development; innovational learning-teaching techniques and resources communication; instructional design coordination, development and evaluation; advisory and consultative services for both faculty and executive administration; and systematic evaluation for the entire program and individual projects.

Program Staff Responsibilities

A variety of program staff positions was identified according to program priorities, scope, and services. These positions ranged

from learning design research to instructional equipment dissemination. Most programs had sub-divisions with coordinators or supervisors assigned responsibilities for separate area operations.

Specific Methods of Program Evaluation

One of the major lacks of all of the selected programs was that of systematic evaluation. Most of the programs and specific academic improvement projects were initiated with enthusiastic statements about purposes, functions, and priorities. As the programs evolved, evaluation techniques had been undertaken with varying results. One academic senate developed a program evaluation clause into the original program proposals. This senate required the appointment of an *ad hoc* committee to examine the extent and the effectiveness of educational development activities and to recommend desirable changes. Other programs had less rigid program evaluations.

All of the program directors agreed that evaluation is a vital procedure. All agreed that this aspect was the weakest sector of their programs. Several of the selected programs had evaluation offices but with one exception, the major task of these sections was the scoring of examinations.

Several programs developed and disseminated annual program reports with instructional research, course development, and support service logistics. Other types of evaluative techniques had been employed in relationship with program academic improvement projects. These techniques included: learner attitude analysis; faculty attitude

surveys; instructional design services utilization rate by department inventory; transferability of successful projects from one department to others; analysis of support service as a solution for major university problems; and cost effectiveness. These cost factors included analysis of facilities utilization, faculty man hours, extent of course content which can be meaningfully mediated, and the more efficient management of academic personnel at various levels (professorial, classified staff, technician, etc.).

The writer wishes to conclude this program evaluation analysis with this observation. A genuine credibility gap may exist if that program does not operate in the systems approach scope with evaluation being an integral element!

CHAPTER V

ATTENTION IN THE MOTIVATIONAL SEQUENCE

Educators are hopefully according timely *attention* to the concerns and actions of responsible critics of higher education. A percentage of the current "student unrest" found at our major universities has been extreme and unscientifically based. The challenge is focusing *attention.*

Concerned patrons and supporters of higher education are attempting to focus *attention* upon the needs of higher education. Questions are currently being asked about the dynamic characteristics of higher education in a rapidly changing society. Other questions are being raised about the unique characteristics of the university as it attempts to maintain quality.

Major *attention* has been given to the systems approach in other areas of society including the military and business-industry. Specific *attention* for the consideration of a systems approach to education was suggested in the mid-1950s by Hoban,[1] Finn,[2] Bern,[3]

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[1]Charles F. Hoban, "The Establishment of Instructional Technology," Educational Technology, VIII (October, 1968).

[2]James D. Finn, "AV Development and the Concept of Systems," Teaching Tools, Fall, 1956.

[3]H. A. Bern, "Audio-Visual Engineers?" AV Communication Review, IX (July-August, 1961).

Bertalanffy,[4] and others. In 1958, Carpenter and Greenhill[5] documented the application of a systematic approach in closed circuit television.

In a motivational sequence, *attention* is the first priority for consideration. Currently, a number of methods are being sought which will involve, articulate, communicate, and give *attention* to the instructional needs of our colleges and universities.

A Rationale for Educational Reform in the Motivational Sequence

A most influential element in building a *rationale* is the nature and direction of habitual change in society. As educators consider a *rationale* for reform, basic assumptions stated by Carpenter might be usefully reviewed.

1. The whole educational task is to provide favorable learning conditions for persons who have the needs, rights, and abilities to learn. How can this be done?

2. The needs-demands aspects of higher education are unlimited, but educational operations are limited, bounded, and restricted. What are the conditions, including human factors, which set undue and non-adaptive limits and boundaries to educational services and activities, and how might these limits and boundaries be made more coextensive with the needs and demands for educational services?

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[4]Ludwig von Bertalanffy, "An Outline of General Systems Theory," British Journal of Philosophical Science, I, 1960.

[5]C. R. Carpenter and L. P. Greenhill, An Investigation of Closed Circuit Television for Teaching University Courses, Report No. 5 (University Park: The Pennsylvania State University, 1958).

3. The kinds and amounts of work of higher education, however defined, cannot be accomplished fully by traditional approaches, methods, and procedures. What are the means potentially available that make it possible to accomplish more nearly than at present the goals that are expected of colleges and universities?

4. There is in progress a true revolution in the science and technology of communication and information management, and many parts of the products are applicable in education.

5. What parts of the technologies of this development are applicable to the tasks and requirements of education for which colleges and universities are generally responsible?[6]

At many universities, an attempt to design innovational learning techniques is retarded by the ultra-economy of time, effort, and priority factors. Many academic faculties find it difficult to give a higher priority to the improvement of the instruction because of limited released time, monetary faculty rewards for instructional improvement, and the unavailability of academic support services. In some institutions, all of these elements may be present but lack of coordination and communication reduce the amount and quality of academic improvement.

McBeath[7] suggests that an initial exploration point of educational innovation is at the observable world of technology and its

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[6]C. Ray Carpenter, "Instructional Functions of New Media," New Media and College Teaching, eds. James W. Brown and James W. Thornton (Washington, D.C.: Department of Audiovisual Instruction and the Association for Higher Education, 1968).

[7]R. J. McBeath, "Is Education Becoming?" AV Communication Review, XVII (Spring, 1969).

related world of science. He identifies these two elements as the major agents of change, and that they tend to define the total pattern of changes which influence every aspect of life, including present trends of education. He maintains that educators are evolving from autocratic and laissez-faire styles toward democratic control of learning. In the past, pedagogical styles have advanced a teaching or performance *for* students. Our present frame of reference would advance the style of accomplishing educational goals *with* learners. As educators move toward greater independent study with the accompanying emphasis on learning readiness, involvement, and inquiry, entrance and performance levels will vary. These levels may include mastery, adventure, or self-actualization.

In a catalytic style to assist with this educational reform, a National Institute of Education has recently been proposed to Congress by President Richard M. Nixon. This proposed national level, systematically-structured office is perceived to be dynamic in nature. The scope of the proposed Institute should be to assist, facilitate, stimulate, and communicate educational reform. With the major goal of increasing the nation's educational priorities, the systematically-structured Institute could serve as a model for state departments of education, universities, and school systems at all levels.[8]

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[8]Richard M. Nixon, Message on Educational Reform, Delivered to the Congress of the United States, The White House (Washington, D.C.: U.S. Government Printing Office, March 3, 1970).

The *Model* of Educational Development and Instruction Design for the Improvement of Learning in the *Motivational Sequence*

A working *model* must be built upon the most acceptable theoretical thought along with experience gathered from functioning, implemented *models*. In an attempt to meet these criteria, a survey of literature has been combined with selected program case studies.

Model Program Title, Purposes and Priorities. From the study analysis of the six institutions and the review of literature cited, it is proposed that the most acceptable and descriptive program title for a university academic support program *model* is the University Institute for Learning. The three major words of this proposed *model* title may have psychological strength in addition to their program purpose communication aspects. "University" denotes a service agency structured for and giving assistance to the total-university community. A misconception could exist since the word "education" or "educational" parallels a university college (i.e., college of education). The word "institute" connotes an organization to promote the art and science of educational technology. "Learning" is the objective of the entire educational effort.

This catalytic agency should, through an advisory group, assist, facilitate, communicate and stimulate academic requests in order to promote learning. The *model* Institute could assist with comprehensive long-range planning for educational development for the entire campus(es).

The two major divisions of this proposed University Institute

for Learning are the Learning Institute Advisory Council and the Learning Technology Coordination. Educational development (curriculum scope and sequence) advisory is the major goal of the Institute Council. The stimulation, coordination, and facilitation of communication among university with non-university groups could be initiated by the Institute Advisory Council. The educational development advisory input could be analyzed and synthesized during the Learning Technology Coordination procedure (instructional design). The Learning Technology Coordination would integrate Learning Research, Learning Design with Evaluation, and Learning Resources Implementation Design. These integral units would constitute the learning design process which is outlined in a seven procedural criterion listing which has been approved by National Education affiliates, the DAVI and AHE.[9] The Learning Resources Implementation Design integrated unit would coordinate two sub-units: Learning Institute Dissemination and Learning Institute Production. These sub-units would utilize the academic support services of the Learning Resources Reference (available resources), Learning Channels Reference and Service (consultation, dissemination and maintenance), and Learning Resources Production (locally designed and developed resources).

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[9] James W. Brown and James W. Thornton. New Media and College Teaching. (Washington, D.C.: Department of Audiovisual Instruction and the American Association for Higher Education, 1968).

The Learning Institute Advisory Council Division

The educational development advisory scope of the *model* Institute should coordinate and facilitate articulation and communication among faculty members, their department and the executive administrative staff. The coordination activity provided by the advisory group should relate to curriculum determination input. In addition to coordination as a means of improving faculty-department communication with the executive administrative levels, total coordination should include student representatives, representatives from the professions, business-industry, governmental agencies, and the community at large (i.e., religion, civic organizations, charitable agencies, etc.).

The Learning Technology Coordination Division

This proposed *model* Institute would coordinate academic support assistance, facilities, communication, and stimulation. The academic staff interacting with the Institute-coordinated expertise could develop a means (learning research with validation) of evaluating learning techniques, strategies, resources, and learner mastery levels. With a determination of the most effective strategy of learning for each university student, implementation of this research should be immediate and dynamic in nature. Learning application should reflect this dynamic characteristic which is inherent in a systems approach. As Bertalanffy has defined biologically, a living organism is a sub-system with behavioralistic elements which is influenced by a larger system, the

environment.[10] The learner is a sub-system influenced by a changing society, the larger system. The proposed *model* Institute could catalytically assist with modification of learning requirements in a fast-changing, unrestful society.

In addition to the personnel coordination function, the proposed *model* Institute should be responsible for the coordination of all academic support services (i.e., photographic production, campus television, film library, computer center, testing-evaluation services, printing and duplicating services, media center, library, and course development services). Appropriate coordination should enhance the accessibility and efficiency of all academic support services and resources. Following curriculum determination (Educational Development) including learning scope and sequence, the Learning Technology Coordination (Instructional Design) process follows. This activity integrates the Research Unit, the Design and Evaluation section and Resources Implementation Design advisory.

The Learning Technology Coordination is defined in terms of managing the man-machine aspects for the control of the learning process. This coordination procedure blends the learners with all learning resources, both human and instrumental.

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[10] Bertalnaffy, loc. cit.

The Learning Research Unit

The Learning Research Unit should analyze and synthesize learning problems. The research findings would generate a means for major learning technique solutions. Greenhill and others[11] maintain that learning research constitutes a basic foundation for academic advancements. Research for various models for improved methods, procedures, and approaches of learning in higher education is necessary. This includes research on methods of mediating information and stimulating human learning which would be major goals of this proposed Institute.

The Learning Design with Evaluation Unit

In the systematic instructional design process, course goals and objectives should be developed. Course intents and the taxonomies of instruction should be identified and defined. Special emphasis should be placed upon the learning content competencies (i.e., knowledge, thinking, attitudes, and skills). Modes of learning strategies (i.e., presentation, interaction, or independent) should be determined. Learning design should be directly combined with educational evaluation expertise. The placement of evaluation in the early stages of instructional design places an added emphasis upon its significance.

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[11]Leslie P. Greenhill, "Learning Resources for Higher Education," Medical and Biological Illustration, XIV (October, 1964), 256.

The Learning Resources Implementation Design Unit

At this point in the learning design procedure, appropriate learning resources would be located or produced for validation and implementation along with suitable learning strategies. The resource validation could be synthesized systematically by the Learning Research unit. All Learning Technology Coordination processes would be continuously unified in a systems approach.

The Learning Institute Dissemination and Production Sub-Units

Major modifications must be stimulated immediately in education. This process can be facilitated with a scope of academic dissemination and production support services formula developed by Merrill and Drob. In their publication, "Criteria for Planning the University Learning Resource Center,"[12] they explained that learning technology support services may evolve and develop based upon the scope of services needed. This scope must be determined in terms of minimum and maximum utilization. Minimum utilization scope of support services would provide only the least items of service which could be justified in the total campus-wide utilization. The maximum extent of utilization would provide adequate support personnel and facilities for every item of service justifiable. In the evolution of a learning technology,

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[12]Irving R. Merrill and Harold A. Drob, "Criteria for Planning the University Learning Resource Center," Report for the President's Advisory Committee on Education Television (San Francisco: Communications Office for Research and Teaching, University of California, March, 1970), pp. 1-2. (Mimeographed.)

between the minimum and maximum utilization scopes of support services, two intermediate levels of services have been added. Evolving from a minimum level to the next level with additional support personnel and facilities could be justified by logistics and long-range educational development planning.

This criterion of service scope could be determined by academic faculty involvement and utilization of the *model* Institute offerings. A minimum service scope could be justified for the dissemination of resources function. If the faculty members, in general, instructionally design their courses, only Service Scope D (the minimum service scope level) could be justified. At this service scope level, only extension of technological instruments and resources could be justified.

At the next level of service scope evolution (Service Scope C), the academic faculty would become aware and involved with the development of learning resources. The basic elements of course development as defined by Banathy[13] and others could develop a system for learning with the following factors: course rationale, goals statement, learning objectives formulation, learner entry level evaluation, learning task analysis, learning system design, learning resources implementation, learning program evaluation, and learning system modification.

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[13]Bela H. Banathy, Instructional Systems (Palo Alto, California: Fearson Publishers, 1968).

With the evolution to Service Scope Level B, faculty members would involve greater learning sophistication than the previous Service Scope Level C which would be facilitated in a "traditional lecture style" classroom setting with general utilization of large group multi-resources. Service Scope Level B would completely integrate the academic faculty with the learning development-design support team. Major concern at this level would focus upon increasing learner performance and mastery in a variation of learning strategy formats. This level of instructional design could involve an integral approach of learning strategies including presentation, interaction, and independent. Instructional design coupled with educational development at this level would be concerned with learner outcomes relevant to the individual, the subject discipline, the institution, and society in general.

Because we are at only the "threshold" of knowledge about the art and science of learning and its technology, this writer will place Service Scope Level A in reservation for further learning technology development. This service support level scope criterion must be left open-ended because of the need for a systematic approach with modification efficiency.

Simply stated then, the *model* Institute priorities include catalytic assistance with improved facilities coordination and services, and communication with stimulation for academic improvement.

Institute Structure with Relationship to the Chief Academic Officer

The *model* Institute directorate must be placed in a direct line with the university chief academic officer. Direct communication

is necessary for liaison articulation, academic project finance, and the facilitation of educational development.

Qualifications and Responsibilities of *Model* Learning Institute Advisory Council

To assist with the goals, objectives, facilitation, and communication of the *model* Institute, it is proposed that an Institute Educational Development Advisory Council be created. This *model* Council should be selected by the chief academic officer, the official representative of the campus chief executive office, university chief executive, and the elected board of trustees. Selected *model* Council members should be selected from the university administration, academic faculty, and student body along with representation of non-university ranks (i.e., professions, business-industry, government, community, etc.).

The *model* Council would assist in an advisory capacity with the Institute priorities. Specifically this *model* Council could assist with the *model* Institute's policies and guidelines, and facilitate the coordination of advisory input into the university educational development activities. This Council could administer available discretionary funds which are made available to faculty members on a proposal-grant funding basis. The *model* Institute Director should be autonomous in relationship with this group and should possibly be the *ex officio* Institute Chairman.

Qualifications and Responsibilities of the *Model* Institute Directorate

Basically the *model* Institute staff must be minimal. An excessively large directorate must not project the appearance of a wasteful bureaucracy or the impression of an "empire."

The *model* Institute Director and his associate(s) should have earned doctorates; professorial status; relevant administrative experience and ability; and experience and specialization in the areas of educational development, educational technology with instructional design, learning resources, and evaluation expertise; research; and teaching and learning in the arts and humanities.

Basically the directorate is responsible for administering the *model* Institute and giving attention to the priorities of assistance, support personnel and facility allocation and coordination. Maintenance of a strong, dynamic, communicative liaison with faculty, administration, students, and non-university representatives will be required.

Qualifications and Responsibilities of *Model* Institute Staff Personnel

The number of qualifications of all staff members would be determined logistically by the criteria of support services scope and by the university student enrollment.

The student enrollment criterion, a second consideration of the allocation of facilities and staff personnel, was developed by Merrill and Drob.[14] Based on the formula that the average university

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[14]Merrill and Drob, loc. cit.

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[14]Merrill and Drob, loc. cit.

learner interacts a minimum of ten per cent of his direct learning time with non-print resources, another support service personnel allocation logistical factor is advanced.

Depending upon the support level scope of *model* Institute services, a basic instructional design team would include professional and clerical staff personnel.

A Learning Technology Coordination Associate Director would have a doctorate and expertise in educational psychology, educational testing and measurement, computer science, and research. The major responsibility of this directorate member would be to coordinate personnel in the Learning Design with Evaluation section and the personnel in the Learning Resources Implementation Design section. Initiation of all Learning Technology Coordination services for Learning Support Service Levels D and C (as outlined by Merrill and Drob) could be initially justified. All provisions for course development, including instructional design with evaluation and learning resources implementation design services, must be initially made available. When faculty members evolve to Systematic Course Development Level C and wish to aspire on to Learning Support Service Level B, a greater learning design sophistication level, additional learning support personnel for programmed learning development would be an example of necessary accessions to permit the independent learning strategy to be facilitated.

Professional personnel could be responsible for the following individual integral units: Learning Research; Learning Design with

Evaluation; Learning Resources Implementation Design with Learning Resources Reference; Learning Channels Reference and Service; and Learning Resources Production. These units would be staffed to provide requested learning resources and services as determined by the criteria of scope of services and student enrollments. Graduate students who are specializing in educational technology could be placed in Institute dissemination and production staff positions.

A graphic procedural planning model of a University Institute for Learning on the following page expresses the major areas (Educational Development, Instructional Design, and Learning Implementation). Each institution should interpret this model with an emphasis on their individual administrative organization plan. As humanitarians charged with an educational development responsibility, how may one *visualize* the ramifications of this proposed effort?

Visualization of the *Model* University Institute for Learning in the *Motivational Sequence*

Frank Browles writes that the democratization of education that is now taking place and that will go on in the future will affect our educational system profoundly.[15]

As educators develop solutions to meet this challenge in society, concerned critics of "university change" express sincere

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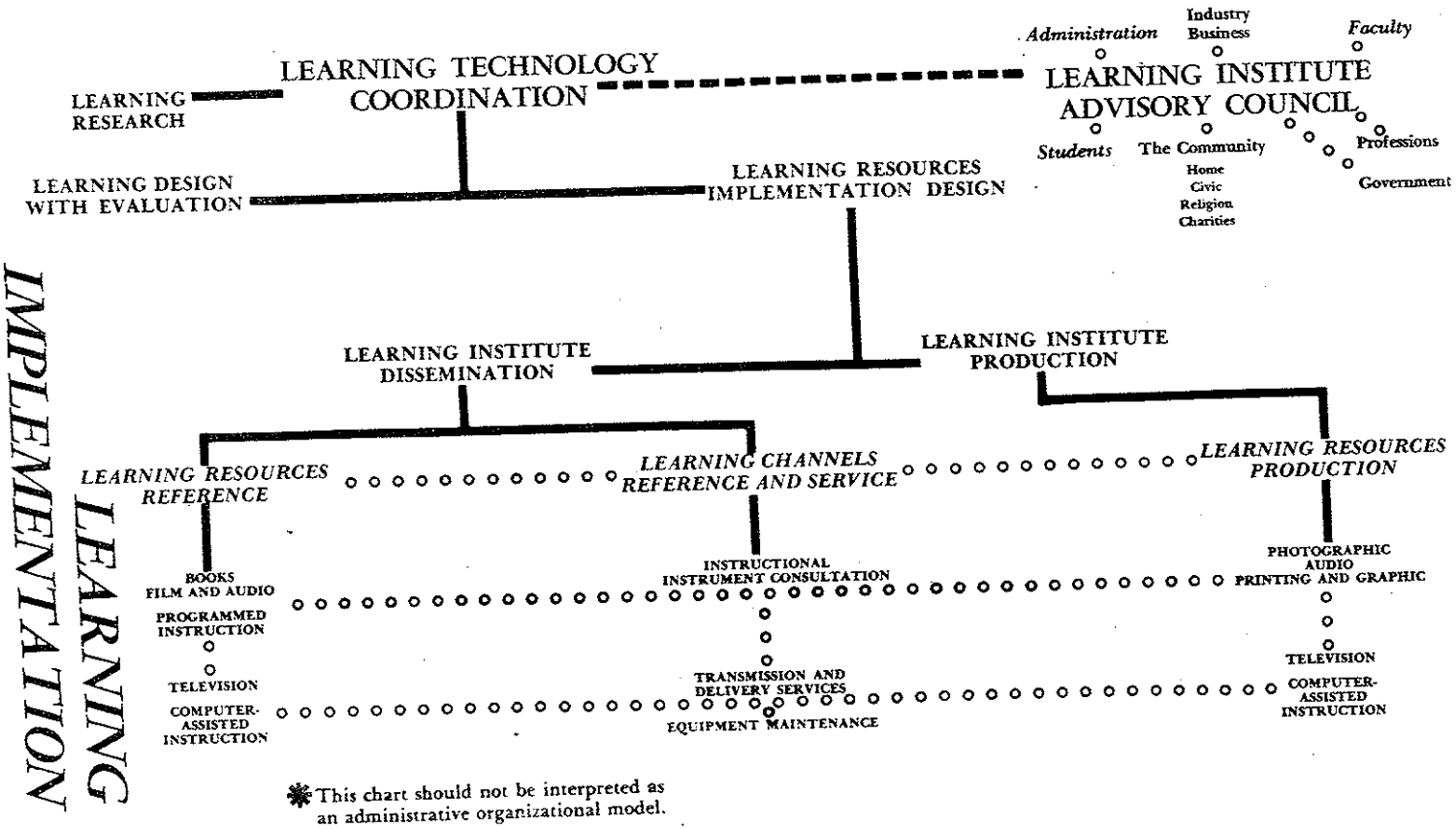
[15]Rank Bowles, "The Dual-Purpose Revolution," NEA Journal, LV (December, 1966), 40.

A PROCEDURAL PLANNING MODEL*

by James G. Buterbaugh, Ph.D.

UNIVERSITY INSTITUTE FOR LEARNING



*This chart should not be interpreted as an administrative organizational model.

LEARNING DESIGN

EDUCATIONAL DEVELOPMENT

LEARNING IMPLEMENTATION

anxiety. The proposal of the *model* University Institute for Learning does not lessen the need for advanced study with the benefits of "academic freedom," nor of educational research. This can survive under the structured control for educational development.

These two concepts (advanced study and educational research) can function together if professional competence supports both enterprises.

Bowles writes:

> If our colleges and universities do not concern themselves with educational reform, they can, indeed, open the possibility of real damage to our educational system. The damage will take the form of a watering down, of a substitution of good intentions for good teaching, and of bureaucracy for leadership. This will be caused by a lack of trained professionals to accomplish tasks and will result in lowered standards, drifting students, and education without purpose.
>
> In the long run, it is our colleges and universities that are the board of strategy for this revolution, by reason of the decisions they make, the actions they take, and the men they train. Only if we forget this are we in danger.[16]

No matter how satisfying an educator's way of life at the university may be, a changing of society is continual. A rational basis for change is extended in various references including Biblical teachings.[17] Education as a sub-system in the larger system--society--must also change and modify to remain a dynamic priority of life.

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[16] Ibid.

[17] "The Second Letter of Paul to the Corinthians," Chapter 5, Verse 17, The Holy Bible (New York: Thomas Nelson and Sons, 1952), p. 204.

CHAPTER VI

CONCLUSIONS, SUMMARY, AND RECOMMENDATIONS

This final chapter contains three sections: (1) conclusions, (2) summary, and (3) recommendations. The first section expresses the conclusions determined from data collected at the six selected universities which were visited by the author. The summary section reviews the scope and nature of instructional design programs in institutions of higher education as determined by the review of literature, the single visitation to the selected universities, and by written questionnaire data. The third section lists recommendations for implementing a University Institute for Learning.

Conclusions

The purpose of this study was threefold: (1) to locate instructional design programs which have been implemented or actively proposed in higher education, (2) to prepare a descriptive analysis of instructional design programs in the six selected institutions of higher education, and (3) to make recommendations for implementing an instructional design program.

On the basis of the findings of this study, the following conclusions are presented:

1. The six selected institutions of higher education have classified their instructional design programs in one of three major categories: (1) educational development, (2) instructional research

and services, or (3) instructional resources production and dissemination. Each considered the program to be catalytic in nature to assist, facilitate, communicate, and stimulate the academic priorities.

2. The six selected program directors gave an overall rank of the program priorities in the following order: (1) to improve instruction, (2) to identify academic problems and (2) to stimulate and conduct learning research, (4) to provide learning design services, (5) to communicate progress in learning research, experimentation, and implementation, and (6) to disseminate learning resources.

3. All interviewed program directors emphasized that the instructional design process must be actively integrated with the total-university educational development process.

4. The six programs were structured and organized in direct liaison with the university chief academic officer such as the vice-president in charge of instruction or the provost.

5. An analysis of a program advisory group revealed a need for an advisory council specifically established for the program's continued support, effectiveness, and quality.

6. The program directors suggested that the program's effectiveness, liaison, and support would be enhanced if the program directorate served as chairman of the advisory group.

7. The major qualifications of the program director included holding the doctorate with experience and specialization in the total instructional design process and in educational administration. The directorate should hold professorial rank in order to have

academic credibility. Several persons interviewed mentioned that the program director should be at least forty years of age which suggests considerable experience.

8. The general pattern of a learning research units is best incorporated within instructional design.

9. Learning resources implementation was identified as a major and integral element of the instructional design process.

10. The major functions of learning resources implementation design were identified as learning resources production and learning resources dissemination.

11. The services which were identified as being vital for learning resources production were: photographic, audio, print, graphic, television, and computer-assisted instruction.

12. The major sub-units of learning resources dissemination which were identified were learning resources (software) reference and learning channels (hardware) reference and service.

13. The resources listed as learning resources were books, film, audio tape, programmed instruction, television, and computer-assisted instruction.

14. The learning channels reference and services were identified as instructional instrument consultation, transmission and delivery services, and equipment maintenance.

15. The personnel program learning resources implementation indicated a strong desire for dissemination and production service areas to be in close proximity for ease of liaison and maximum benefits.

16. All program administrators indicated a strong desire for all program-integrated sections to be housed physically in a central location. Such placement should strengthen inter-departmental assistance, facilitation, communication, and stimulation.

17. All selected programs were either structured or evolving toward a systematic approach to operations.

18. The most frequently cited deterrent for achievement of a systematic approach was the lack of adequate methods of program evaluation.

Summary

Educators in higher education are becoming more sensitive to and motivated about academic priorities and the improvement of instruction. Many programs are being actively planned and/or implemented in higher education to assist, facilitate, communicate, and stimulate the provision of improved learning conditions. Educators are becoming more alert to the needed conditions by the learners for maximum development. Executive support is vital for educational development and instructional design to be successful and effective.

Conditions for human learning limits must be emphasized and remain paramount. Through instructional design services, including learning research, the limits and boundaries may be modified. Specialists in the field of learning technology believe that solutions to these learning problems cannot be achieved by traditional approaches, methods, and procedures. A current revolution in the

sciences and technology of communication and information management is in evidence. The impact of coordination is observable but even more systematic approaches with adequate evaluations are needed to demonstrate the effectiveness of these techniques.

The future success of learning technology depends upon effective implementation and evaluation. The art and humanity aspects of the learning technology must be placed into a proper perspective with the applied scientific elements. Only if this is accomplished with a demonstration of the desired results (accountability), will the learning technology approach be justified.

Recommendations

On the basis of the findings and conclusions of this study, a University Institute for Learning is recommended with the following action:

1. To disseminate to staff, students and governing boards the program's proposed *model* Institute for Learning intent, purposes, and priorities.

2. To receive approval to implement the Institute from the university faculty, the student body, and the administration which represents the Board of Trustees.

3. To select members of the Learning Institute Advisory Council. The University executive administration would select Advisory Council members from the faculty, student body, business-industry, the professions, the community, the government and from

the executive administrative offices. In turn, the Advisory Council would suggest the program directorate members for the administration to consider for appointment.

4. To arrange for program funding support. Potential sources of program funding could include the following: research grants, private foundation grants, the proposed National Institute of Education or other federal government grants, and the major academic funding source--the executive academic office of the university. The involvement and interaction of non-university representatives in the educational development process would assist in academic program liaison. This involvement of business-industry, the professions, the community, and the government should stimulate an academic priority increase.

5. To formulate the program's policies and procedures. The Advisory Council with guidance from the program directorate would suggest program guidelines. Final approval of all advisory recommendations must rest with the executive university administration.

6. To announce the initiation of the program with its title, purposes, and priorities. Announcement should be made to the faculty, the student body, and all patrons of the University.

7. To activate if not present, or assign if present, the functions to be performed by the Learning Resources Implementation Design Unit, including Learning Resources Reference, Learning Channels Reference, and Service and Learning Resources Production.

8. To operate the program in a systematic and dynamic manner.

In conclusion, this writer wishes to quote Henry David Thoreau:

If a man does not keep pace with his companions, perhaps it is because he hears a different drummer. Let him step to the music which he hears, however measured or far away.[1]

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[1]Henry David Thoreau, "Walden Conclusion," Bartlett's Familiar Quotations, ed. Christopher Morley (Boston: Little, Brown and Company, 1948), p. 515.

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APPENDIX A

Cover Letter and Questionnaire

February 5, 1970

Dr. Getscher L. Technology
Vice President for Academic Affairs
Administration Building for Learning
University of Learning Priorities
Academia, Nebraska

Dear Dr. Technology:

Your institution has been selected for inclusion in a higher education study of instructional improvement and development programs. Totally 47 major universities are being surveyed for the nature and extent of their instructional improvement or development scope and program structure. I am requesting that you complete and return at your earliest convenience the enclosed brief questionnaire which describes your University's means or instructional improvement or development provisions.

Criteria in New Media and College Teaching (published by the National Education Association Department of Audio Visual Instruction in collaboration with the American Association for Higher Education) provide basic guidelines for an educational development approach. This plan has generally been called an "instructional design program," and it correlates the abilities or curriculum, media resource, and evaluation specialists. This expertise provides major guidelines for course development, resource implementation, and regular, systematic evaluation.

We are attempting to identify instructional improvement or development programs which most nearly parallel the NEA-AAHE criteria. During March and April, I will visit representative programs to develop case studies for analysis.

We sincerely thank you for completing the enclosed brief questionnaire. If I may extend specific descriptive data or final study recommendations for your analysis, please advise.

Awaiting your responses, I remain. . .

Cordially,

Jim G. Buterbaugh, Head
INSTRUCTIONAL MEDIA CENTER
UNIVERSITY OF NEBRASKA

JGB/clb

Enclosures: Questionnaire
Stamped Return Envelope

INSTRUCTIONAL IMPROVEMENT OR DEVELOPMENT PROGRAM QUESTIONNAIRE

YOUR NAME AND TITLE_____

*Has your university implemented an instructional improvement or development program which provides full services for any academic department which requests media resource or other pedagogical expertise?*_____

*Does your program serve curriculum revision needs?*_____

*Does it centrally provide media equipment and resources?*_____

*Can your approach regularly and systematically evaluate course and program feedback?*_____

Name of Instructional Improvement Program Director_____

Check each of the following criteria as INTEGRAL, AVAILABLE, PLANNED, or UNAVAILABLE, which best describes instructional improvement provisions of your University:	**INTEGRAL** Major responsibility of central systematically correlated instructional improvement program.	**AVAILABLE** Support available from an agency not necessarily correlated in an integral approach.	**PLANNED** Not presently implemented but forthcoming.	**UNAVAILABLE** Support only available at academic department level.
To technically encode curricula goals and objectives.				
To define and plan efficient instructional strategies (i.e. independent, interaction and presentation.)				
To test and analyze student learning capabilities.				
To study and recommend available professional staff and clerical talent support with special capabilities in performing planned instructional tasks.				
To provide media reference services.				
To design and develop media resources.				
To provide media equipment services.				
To evaluate, systematically, all aspects of the program.				
To survey the institution's total instructional resources, facilities, services and budgets for improvement or expansion purposes.				

To expedite questionnaire return, this response sheet has been succinctly designed. Please submit copies of documents, memoranda to faculty or press releases which further relate your program's scope and purpose.

APPENDIX B

Chief Academic Officers and Program Administrators Who Received the Written Questionnaire

Chief Academic Officers and Program Administrators Who Received the Written Questionnaire	Enrollment	Responses* 1	2	3
ARIZONA				
Dr. Karl H. Dannenfeldt, Academic Vice President Arizona State University at Tempe	25,473			X
Dr. Walter H. Deleplane, Vice President of Academic Affairs University of Arizona at Tucson	23,617			X
CALIFORNIA				
Dr. Leonard Machlis, Assistant Chancellor for Educational Development University of California at Berkeley	28,132	X		
Dr. Rosemary Park, Assistant Vice Chancellor of Academic Affairs University of California at Los Angeles	28,288		X	
COLORADO				
Dr. Richard Fox, Coordinator of Academic Planning University of Colorado Main Campus at Boulder	18,217	X		
FLORIDA				
Dr. Russell P. Kropp, Director of Instructional Research and Service Florida State University at Tallahassee	16,303	X		

* 1--Fully implemented instructional design programs which have been identified to assist, facilitate, communicate, and stimulate the university's academic priority.

2--Plans are being actively proposed to develop a program with all instructional design capabilities.

3--Academic support services are unsystematic and segregated.

Chief Academic Officers and Program Administrators Who Received the Written Questionnaire	Enrollment	Responses* 1	2	3
FLORIDA (continued)				
Dr. Ernest H. St. Jacques, Assistant Dean of Academic Affairs for Evaluation and Development University of Florida at Gainesville	21,389		X	
GEORGIA				
University of Georgia at Athens	21,182			
HAWAII				
Dr. Charles Neff, Academic Assistant to the President University of Hawaii Main Campus at Honolulu	17,249	X		
ILLINOIS				
Southern Illinois University Main Campus at Carbondale	22,504			
University of Illinois Urbana Campus	34,501			
INDIANA				
Dr. Gene Faris Professor of Education and Consultant to the Vice President for Academic Affairs Indiana University at Bloomington	29,054		X	
Mrs. M. Elizabeth Staaks, Assistant to the Vice President for Academic Affairs Purdue University Main Campus at Lafayette	24,979			X
IOWA				
Dr. George C. Christensen, Vice President for Academic Affairs Iowa State University of Science and Technology at Ames	18,083			X

Chief Academic Officers and Program Administrators Who Received the Written Questionnaire	Enrollment	Responses* 1	2	3
IOWA (continued)				
Dr. William B. Oglesby, Director of Audio-Visual Center University of Iowa at Iowa City	19,506			X
KANSAS				
Dr. Francis H. Heller, Dean of Faculties and Acting Provost University of Kansas at Lawrence	16,867		X	
KENTUCKY				
Dr. Lewis W. Cochran, Dean, Graduate School and Vice President, Research University of Kentucky Main Campus at Lexington	16,067			X
LOUISIANA				
Dr. Paul E. Loenig, Associate Dean of Academic Affairs Louisiana State University at Baton Rouge	19,221			X
MAINE				
Dr. James M. Clark, Vice President for Academic Affairs University of Maine - All Campuses at Orono	18,226		X	
MARYLAND				
Dr. R. Lee Hornbake, Vice President for Academic Affairs University of Maryland Main Campus at College Park	40,229			X

Chief Academic Officers and Program Administrators Who Received the Written Questionnaire	Enrollment	Responses* 1	2	3
MASSACHUSETTS				
Dr. Raymond Wyman, Director of Audio Visual University of Massachusetts Amherst Campus	16,420			X
MICHIGAN				
Dr. Robert H. Davis, Associate Director Educational Development Program and Instructional Development Service Michigan State University All campuses East Lansing	44,421	X		
Dr. Barbara Z. Bluestone, Assistant to the Director University of Michigan at Ann Arbor	38,021	X		
Dr. Harlan L. Hagman, Dean of Administration Wayne State University at Detroit	33,177			X
MINNESOTA				
Dr. James H. Werntz, Jr., Professor of Physics and Director, Center for Curriculum Studies University of Minnesota Minneapolis - St. Paul	60,291			X
MISSOURI				
Dr. Edward C. Lambert, Assistant to the Chancellor in Charge of Television University of Missouri at Columbia	21,234			X
NEBRASKA				
James G. Buterbaugh, Head, Instructional Media Center University of Nebraska Main Campus, Lincoln	18,452			X

Chief Academic Officers and Program Administrators Who Received the Written Questionnaire	Enrollment	Responses* 1	2	3
NEW YORK				
Mr. Stephanie B. Bennett, Administrative Assistant, Communications Center State University of New York Buffalo Main Campus	20,601			X
NORTH CAROLINA				
Dr. Wesley H. Wallace, Professor and Chairman of Department of Radio, Television, and Motion Pictures University of North Carolina at Chapel Hill	16,338			X
OHIO				
Kent State University Main Campus	20,271			
Ohio State University Main Campus at Columbus	41,392			
Dr. William A. Day, Assistant Dean of Faculties Ohio University at Athens	22,067	X		
Dr. Robert J. Fopma, Assistant Provost University of Cincinnati	29,171			X
OKLAHOMA				
Dr. J. H. Boggs, Vice President for Academic Affairs Oklahoma State University Main Campus at Stillwater	17,881			X
Dr. Pete Kyle McCarter, Provost University of Oklahoma Main Campus at Norman	19,930			X

Chief Academic Officers and Program Administrators Who Received the Written Questionnaire	Enrollment	Responses* 1	2	3
PENNSYLVANIA				
Mr. Leslie P. Greenhill, Director, Division of Instructional Services Penn State University Main Campus at University Park	34,525	X		
Dr. Roger L. Gordon, Director, Educational Media Temple University at Philadelphia	33,803		X	
Dr. Steve Gow, Dean, Division of Instructional Experimentation University of Pittsburg Main Campus	24,323	X		
TENNESSEE				
Dr. Walter R. Herndon, Associate Vice Chancellor for Academic Affairs University of Tennessee at Knoxville	22,520			X
TEXAS				
Dr. Fred D. Rigby, Associate Vice President for Academic Affairs Texas Technological College at Lubbock	19,034			X
University of Houston	23,713			
Dr. Ernest Tiemann, Director, Instructional Media Center University of Texas at Austin	33,797			X
UTAH				
Dr. Charles H. Monson, Jr., Associate Vice President for Academic Affairs University of Utah at Salt Lake City	19,933			X

Chief Academic Officers and Program Administrators Who Received the Written Questionnaire	Enrollment	Responses* 1	2	3
VIRGINIA				
Mr. Frank L. Hereford, Jr., Vice President and Provost University of Virginia Main Campus at Charlottesville	18,408			X
WASHINGTON				
Dr. Herbert J. Ellison, Assistant Provost University of Washington at Seattle	31,913		X	
WEST VIRGINIA				
Dr. Jay Barton II, Provost for Instruction West Virginia University All Campuses at Morgontown	18,027			X
WISCONSIN				
Dr. Robert E. Najem, Director Research, Design and Evaluation Team University of Wisconsin at Madison	34,670			X
Mr. Robert E. Hoye, Director, Instructional Media Laboratory University of Wisconsin at Milwaukee	16,768	X		

APPENDIX C

University Personnel and Students Who Were Interviewed at the Six Selected Institutions

University Personnel and Students Who Were Interviewed
at the Six Selected Institutions

MICHIGAN STATE UNIVERSITY

Academic Vice President
Dr. John E. Dietrich
Provost and Director of Educational Development Program
Faculty Members
4
Students
3
Program Director
Dr. John E. Dietrich
Provost and Program Director of Educational Development Service
Program Associate Director
Dr. Robert H. Davis
Associate Director
Educational Development Program and Instructional Development Service
Program Supervisors
Dr. Lawrence T. Alexander
Assistant Director
Learning Service

Dr. Paul W. F. Witt, Head
Instructional Development
Instructional Media Center

Dr. Willard G. Warrington
Director
Evaluation Services

Dr. Robert H. Davis
Associate Director
Educational Development Program and Instructional Development Service

Dr. Charles Schuller
Director
Instructional Media Center

PENNSYLVANIA STATE UNIVERSITY

President
Dr. Eric Walker
Executive President

Academic Vice President
Dr. P. M. Althouse
Vice President of Resident Instruction

Assistant Vice President and Program Director
Mr. Leslie P. Greenhill
Assistant Vice President of Resident Instruction and
Director of the Educational Development Program

Faculty Members
5

Students
4

Program Associate Director
Dr. D. W. Johnson
Assistant Director of the Educational Development Program

Program Supervisors
Mr. J. D. Carter
Supervisor
Instructional Television Services

Mr. G. W. Hughes
Supervisor
Motion Picture Services

Mr. R. S. Rosenfeld
Supervisor
Instructional Graphics Services

Mr. D. W. Stickell
Supervisor
Examination Services

Mr. J. P. Mertz
Supervisor
Still Photography Services

Dr. F. M. Dwyer
Coordinator
Instructional Research and Course Development

Mr. R. R. Dimeo
Coordinator
Instructional Services for Commonwealth Campuses

FLORIDA STATE UNIVERSITY

Academic Vice President
Dr. Paul Craig
Vice President for Academic Affairs
Faculty
4
Students
4
Campus Planning Director
Mr. R. Green
Director
University Planning
Program Director
Dr. Russell P. Kropp
Director
Division of Instructional Research and Services
Program Associate Director
Dr. F. Craig Johnson
Associate Director of the Division
Program Supervisors
Dr. Robert Stakenas
Director and Student Development Specialist

Dr. F. J. King
Evaluation Design Specialist

Dr. Gerald Miller
Instructional Developer

Dr. Eldon J. Ullmer
Instructional Developer

Dr. John R. Hills
Director and Measurement Specialist

Mr. William J. Quinly
Director

Dr. Thomas C. Capraro
Instructional Television

Dr. Duncan H. Hansen
Director

Dr. Guenter Schwarz
Director

UNIVERSITY OF WASHINGTON

President
Dr. C. E. Odegaard
Academic Vice President
Dr. Solomon Katz
Provost

Dr. Herbert J. Ellison
Assistant Provost
Faculty Members
3
Students
2
Program Director
Dr. Gerald M. Torkelson
Chairman
Ad Hoc Committee to Study Instructional Media
Program Associate Director
Dr. Carl B. Allendoerfer
Chairman
Ad Hoc Committee to Study Programmed Self-Instruction

UNIVERSITY OF CALIFORNIA at BERKELEY

Academic Vice President and Program Director
Dr. Leonard Machlis
Assistant Chancellor for Educational Development and Program Director
Faculty Members
3
Students
3

UNIVERSITY OF CALIFORNIA at LOS ANGELES

Academic Vice President
Dr. Rosemary Parks
Assistant Vice Chancellor of Academic Affairs
Campus Planning Director
Mr. Adrian Harris
Director of University Planning
Faculty Members
3
Students
2

UNIVERSITY OF CALIFORNIA at LOS ANGELES (continued)

Program Director
Dr. Frank E. Hobden
Director
Academic Communication Facility

Program Associate Director
Mr. Donald A. Dennis
Assistant to the Director
Academic Communications Facility

Program Supervisors
Ms. Alice B. Crosby
Central Administration

Mr. John R. Jacobs
Audiovisual Services

Mr. Joseph Geissinger
A.V. Technical Services Shop

Ms. Gwynne M. Gloege
Graphics and Illustration

Mr. John R. Jacobs
Instructional Media Library

Mr. Charles G. Schelling
Motion Picture Production

Mr. Harold H. Kuerschner
Research and Development

Ms. Mary Ellen King
Specialized Stock and Store

Mr. Howard E. Tribe
Still Photography

Mr. L. Morris Wakefield
Television Engineering

Mr. Richard I. Tumin
Television Production