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Topics in this annotated bibliography on audiovisual instruction include the history of instructional technology, teacher-training, equipment operation, administration of media programs, production of instructional materials, language laboratories, instructional television, programed instruction, communication theory, learning theory, and research. Introductory comments to the bibliography briefly sketch the historical background of audiovisual instruction, the concrete-abstract continum in which audiovisual materials represent the semi-concrete experience, the effect, good and bad, of pictorial media on pre-school children, and the recent development of the instructional materials center. (GO/MF)

A SERIES ONE PAPER FROM

ERIC at Stanford

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A BASIC REFERENCE SHELF

ON AUDIO-VISUAL INSTRUCTION

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With Introductory Comments by Edgar Dale

August, 1968

A BASIC REFERENCE SHELF ON AUDIO-VISUAL INSTRUCTION

1. *The historical background*

Varied learning theories relate to and characterize historical movements in the audiovisual field. The rote memorizing of meaningless words and sentences has long plagued educational efforts. The Dutch scholar Erasmus (1466?-1536) recommended the combating of verbalism by acquainting children with familiar objects and animals through informal methods--stories, pictures, games, and object teaching. Johann Amos Comenius (1592-1670), a Moravian bishop, prepared one of the first "visualized" textbooks. It had some of the characteristics of present-day programmed instruction.

Jean Jacques Rousseau (1844-1910) sharply criticized the education of his time saying, "Take the reverse of current practice and you will almost always do right." In publishing *Emile*, he tried to show how the natural man may be developed by education--"Make your child attentive to natural phenomena and you will soon make him curious." Further, Emile received individual instruction, from a tutor. Charles Dickens (1812-70) satirized English education in *Hard Times* not only for its excessive verbalism and factual emphasis but also for its failure to develop a sense of wonder. Unfortunately, the criticisms made by Erasmus, Comenious, Rousseau and Dickens are still valid. We are still trying to develop meaningful education.

2. *The concrete-abstract continuum*

The process of education is basically the development and use of concepts. We conceptualize by seeing differences in likeness and likeness in difference. Concepts may be placed on a continuum or scale from concrete to abstract. Writers in the audiovisual field have used various models, analogies, or metaphors to represent this scale. All share the idea that concepts will range on a scale from rich, direct, first-hand sense experiences to those which are highly symbolic. The continuum moves from the tangible--the seen, heard, felt, touched sense experience--to the intangible, the highly symbolic, the "lesensed" experience.

However, between the tangible and the intangible concept lies an area with which the audiovisual specialist is deeply concerned. It is the semi-concrete experience, the experience which bears some tangible similarity or resemblance to the original object, event, person, or place.

James Q. Knowlton has defined *audiovisual communication*, in its role as a potential scientific discipline, as "designating that part of the broad field of education concerned with the study of pictorial (and other iconic or analogic) messages as these bear upon the learning process."* An icon is an image. An analogy is something that is like something else; it bears a partial resemblance.

The student of communication, says Knowlton, will study two different kinds of messages--the verbal which do not look like or resemble the things for which they stand, and the pictorial (iconic) messages--those which directly remind us of the things for which they stand. He notes, too, that messages which partially resemble the idea for which they stand may be physical models, music, and onomatopoetic (like buzz, whiz, sizzle, etc.) words.

Brown and Thornton discuss the special suitability of new media to carry iconic messages:

> Motion pictures, television, and some other media are particularly well suited to the transmission of pictures or other sensory replications of objects, persons, events, and scenes as they would appear "in real life" to an observer at the place of origin. Such presentations, messages, or materials have been described variously as nondiscursive, analogical, or iconic. By whatever name it is called, an iconic sign is one that bears some resemblance to the object it represents. *A strong case can be made for the point of view that the iconic sign, and its peculiar*

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* James Q. Knowlton, "A Conceptual Scheme for the Audiovisual Field," p. 5, *Bulletin of the School of Education*, Indiana University, Vol. 40, No. 3 and reprint.

> *function in communication, is the focal and truly distinguishing characteristic of the new media as a group.* [italics added]*

3. *The field of communication*

The sharp increase in new media and the need for their integration into effective educational patterns has led to a shift away from a narrow audiovisual approach to one which concerns itself more broadly with the use of all appropriate media in systematic programs of education.

It is clear that we shall make increased use of instructional television, computer assisted instruction, and varied forms of programmed instruction. We may expect that what has been called public television (as contrasted with commercial television) will play a more dominant role in the education of the public as a whole.

While we may not accept McLuhan's dictum that "the medium is the message," nevertheless we realize that the medium and the message are closely interrelated. Further, we see that message systems relate to communication through reading and writing, speaking and listening, visualizing and observing. Hence we no longer think of audiovisual materials as an appendage to a curriculum--like frosting on a cake--but rather as integral and working parts of a carefully formulated program of planned educational experiences.

We see this reflected in the modern curriculum developments in foreign languages, mathematics, physics, chemistry, geography and elementary reading, which aim for an integrated use of varied materials. Further, these integrated materials increasingly are tried out experimentally

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* James W. Brown and James W. Thornton. "The New Media in Higher Education: A Rationale," *New Media in Higher Education*, Washington, D.C.: NEA, 1963.

and weaknesses corrected on the basis of feedback from the learner. The extent and methods of programming instruction are still under careful study, but it is clear that audiovisual materials will occupy an important role as a part of the programmed message system.

This does not mean, of course, that there is no place for the single film recording, filmstrip, set of charts. They will always be a part of the repertoire of learning materials used by the versatile teacher. There will always be individualized use of audiovisual media to make a point, to underline a generalization, to open up a new field of study.

Basically the audiovisual specialist of the future will be media-message oriented, sensitive to message-systems, proficient in ways of selecting, utilizing, evaluating, and producing message systems. While his focus will be on iconic signs, on the moving and the still image, he will still be mindful that the symbols of print are often a part of an effective audiovisual message. To the discriminations involved in the literacy of reading, he adds the literacy needed to interpret sounds and pictures which cannot be separated without doing violence to the meanings which they jointly convey. In effective teaching and learning then, we are concerned with the literacy of reading, listening, and viewing.

4. *The educative environment*

Experiential deprivation of all kinds is a concern of the communication specialist. There is poverty of experience as well as material poverty, and they may be closely connected. The critical importance of the years *before* formal school begins is increasingly recognized. Since this is largely a pre-reading stage in the life of the child, his first-hand and iconic experiences become highly important.

Hence the concern with the mass media--photographs, drawings, movies, television, visual displays, the image building experiences of the home and community. The child who is read to, who examines picture books, who has had rich audiovisual experiences, is likely to be a better

reader than one who has been deprived of these experiences. Research studies of the good and bad effects of pictorial media on children and youth leave no grounds for complacency.

For example, we do not build habits of reason and judgment by glorifying unreason and violence on the screen. If we cannot easily change the stimuli, we can certainly change the responses. There is need, therefore, for life-long education in habits of discrimination in viewing, listening and reading. Public libraries, now picture-minded as well as book-minded, provide recordings and films as well as books.

The broad educative environment also includes the narrower instructional environment. A major development now underway is the instructional resources center, also called the learning center. Such centers provide easy access not only to printed material but also to varied audiovisual resources as well. As schools move toward developing the independent learner, toward self-instruction, the furnishing of a wider variety of materials of instruction is imperative. This may mean dial access to films, videotapes, filmstrips, recordings, and other learning experiences.

Sometimes the learning center will provide learning materials geared to individual or local needs. Some centers will provide facilities for the production of materials of instruction. Learning centers may also furnish self-testing experiences, with learning materials available to meet the weaknesses disclosed.

5. *Communication theory and research*

Communication theory and research have increasingly engaged the attention of educators, political scientists, sociologists, economists, linguists, public opinion specialists, and others. Many of the problems of government are problems of public opinion. Caste and class profoundly influence communication. Semantics and syntax are key factors in communicating through language. There is silent language as well as spoken

language. We have such terms as "expressive silence," "the silence was deafening," "silence gives consent," "listening to silence," and "well-timed silence."

John Dewey was deeply concerned with the process of communication. One can find his references to communication under that topic and also under meaning, symbols, language, media, words, concept, symbol. He was concerned with such barriers to communication as external dictation, lack of democracy, avoidance of "the spirit of criticism in dealing with history, politics and economics." [Character and Events II] He contrasted "immediate, direct experience, in which we take part vitally and a first hand" with experiences gained through the intervention of representative media. He speaks of the need for "the intervention of agencies for representing absent and distant affairs" noting that without them "our experience would remain almost on the level of that of the brutes. Every step from savagery to civilization is dependent upon the invention of media which enlarge the range of purely immediate experience." [*Democracy and Education*] Modern media of communication clearly provide this "mediated" approach and we can expect a sharp rise in their use.

HISTORY OF THE AUDIOVISUAL MOVEMENT

1. Saettler, Paul. *A History of Instructional Technology*. New York: McGraw-Hill Book Co. (1968).

Part I of this work traces instructional theory and method from its beginning in early cultures, through the various Greek methodologies, and notes the contributions of such men as Abelard, Cemenius, Pestalozzi, Herbart, Dewey, and Skinner.

Part II systematically covers the emergence and development of the audiovisual instruction movement with chapters on the school museum,

instructional film, instructional radio, instructional television, programmed instruction and an excellent chapter on the systems approach to instruction.

Part III traces the background of instructional media research from its beginnings in 1918 with the first studies on instructional film to the present.

The book contains more than a historical report of the field of instructional technology; it carries a strong thread of instructional theory through the entire work. This work is highly recommended for those interested in the significance of the shift from audiovisual instruction to instructional technology or, as Saettler puts it, the shift from a physical science concept of instructional technology to a behavioral science concept.

BASIC TEXTS FOR PRE-SERVICE AND IN-SERVICE TRAINING OF TEACHERS

2. Brown, James W., Richard B. Lewis and Fred F. Harcleroad. *A-V Instruction: Materials and Methods*. Second Edition. New York: McGraw-Hill (1964).

This text is a comprehensive presentation of the pre-service and in-service training of classroom teachers in the use of audiovisual materials and equipment. It has many specific references to different teaching materials and their use in various subject fields and grade levels. The text draws upon existing research to support the utilization techniques presented. It also contains reference sections on audiovisual equipment, duplicating processes, technical terms and a classified directory of sources. A laboratory-type manual keyed to the text is available.

3. Dale, Edgar. *Audio-visual Methods in Teaching*. Revised Edition. New York: Holt, Rinehard and Winston (1954).

This revised version of Dale's 1946 edition has been the cornerstone

of audiovisual theory for over twenty years. Part I, Theory of Audio-Visual Instruction, is the most valuable part of the book because it deals with the widely known "Cone of Experience." Heavy emphasis is placed on building from "direct, purposeful experiences" toward the use of visual and verbal symbols in a concrete to abstract continuum. Parts II and III cover materials and classroom applications of audiovisual instruction. Recent developments are not included in these sections, but total revision of the work is in progress.

4. DeKieffer, Robert E. and Lee W. Cochran. *Manual of Audio-Visual Techniques*. Second Edition. Englewood Cliffs: Prentice-Hall, Inc. (1962).

This practical tear-sheet manual covers all of the traditional audiovisual equipment and materials and most of the newer educational media. The notable exception is programmed instruction. The manual is designed to be used alone or in conjunction with other AV texts. It emphasizes learner involvement to develop the techniques and skills needed to effectively utilize instructional materials in the classroom. While the material included can be considered basic, several of the chapters need up-dating to include recent developments in the audiovisual field.

5. Erickson, Carlton W. H. *Fundamentals of Teaching with Audiovisual Technology*. New York: The MacMillan Co., Inc. (1965).

In this pre-service teacher education text, Erickson uses audiovisual technology as a synonym for instructional technology in tying the well-established term "audiovisual education" to the relatively new term "instructional technology." The book can generally be considered a basic text for the training of teachers in the selection, preparation and use of audiovisual materials and equipment. One chapter entitled "Creative Design through Basic Principles" is technological and suggests principles for the selection, utilization, and evaluation of audiovisual materials. Although the validity of the principles may be debatable the effort to establish such principles is commendable.

6. Kinder, James S. *Using Audio-Visual Materials in Education.* New York: American Book Co. (1965).

This paperback text introduces pre-service teachers to instructional materials in a practical way. Selection and utilization techniques are dominant to the point of completely excluding equipment operation. A potpourri chapter entitled "Miscellaneous Instructional Materials" covers everything from special display boards to community resources. An appendix containing comprehensive resource lists concludes the work.

7. Thomas, Murray and Sherwin G. Swartout. *Integrated Teaching Materials.* Revised Edition. New York: David McKay Co. (1963).

This basic audiovisual text is designed for use in training both pre-service and in-service teachers. It strikes a balance between techniques of selecting commercially produced instructional materials and the local production of teaching materials. It recognizes the importance of printed materials in the classroom by including four chapters on the selection and utilization of all types of printed materials. Sections on photographed materials, graphic materials, broadcast and recorded materials, and constructed and real-life materials are included. The appendices include source lists for films, records and textbooks.

8. Williams, Catherine M. *Learning from Pictures.* Washington, D.C.: Dept. of Audiovisual Instruction of NEA (1963).

Designed as an aid for classroom teachers, this reference work (now under revision) covers choosing and using pictures and includes a source list of picture materials. Dr. Williams does the audiovisual field a real service by drawing attention to the picture "explosion" at a time when most of the attention is being given to the newer educational media. In addition to the primary source list of picture producers, the work includes a subject index for the primary source list. Selected References.

9. Wittich, Walter Arno and Charles F. Schuller. *Audiovisual Materials: Their Nature and Use*. Fourth Edition. New York: Harper & Row (1967).

The authors had the classroom teacher in mind when they wrote this basic text for pre-service and in-service training of teachers in the use of instructional materials. The work contains many concrete examples of materials in use and has an abundance of photographs and illustrations to supplement the written text. The opening chapters deal with the learning and communications problems of today's teacher. In addition to discussing such audiovisual materials as flat pictures, charts, posters and three dimensional teaching materials, the newer media--instructional television, programmed instruction, etc. are included. The appendix contains an extensive materials and graphic supplies source list.

EQUIPMENT OPERATION

10. Eboch, Sidney. *Operating Audio-Visual Equipment*. San Francisco: Chandler Publishing Co., Inc. (1960).

This 70-page manual teaches technical features and operating principles of projection and sound reproduction equipment. Maintenance and minor repair of equipment are covered along with some simple materials production techniques. The manual is designed to be self-instructional provided the user has the equipment being studied before him. One of the outstanding features of Eboch's work is the clear two-color threading and operating diagrams. Because equipment models change rapidly and new equipment is constantly being developed, a revised edition will up-date the entire manual.

ADMINISTRATION OF MEDIA PROGRAMS

11. Brown, James W. and Kenneth D. Norberg. *Administering Educational Media.* New York: McGraw-Hill Book Co. (1965).

This text is concerned with the organization and administration of educational media programs at all educational levels. After the introductory chapters dealing with the role of educational media in education, personnel requirements and physical facilities for educational media, the remaining chapters can be grouped into two rather distinct groups.

In the first group are chapters on the administration of materials, equipment, production services, budgets, in-service training programs, textbooks, educational television and independent study materials.

Chapters in the second group deal with the administration of media services by educational levels. All chapters do an excellent job of covering their topics, including the final chapter on the systems approach in education which introduces many important instructional management concepts.

DESIGN AND PRODUCTION OF INSTRUCTIONAL MATERIALS

12. Briggs, Leslie J., 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 of Future Research.* Pittsburgh: American Institutes for Research (1967).

This report proposes a solution to a problem which has long plagued audiovisual communication specialists: choosing the most appropriate medium for instruction from an ever increasing number of audiovisual media of instruction. The proposed solution ties the behavioral objectives to

be taught with the eight types of learning identified by Gagne in his book entitled *Conditions of Learning*.

The procedure can be described briefly as: 1) stating the behavioral objectives to be taught, 2) identifying, for each objective, the type of learning involved using Gagne's eight types, 3) identifying the characteristics of stimuli needed to produce learning and the medium which would most effectively display the stimuli, and 4) making the necessary trade-offs in order to produce a usable package of instructional materials. Illustrations for use of the procedure are included in the report. The final chapters include a selective review of literature on audiovisual media of instruction, conclusions, and recommendations.

13. Kemp, Jerrold E. *Planning and Producing Audiovisual Materials*. San Francisco: Chandler Publishing Co., Inc. (1963).

14. Minor, Ed. *Simplified Techniques for Preparing Visual Instructional Materials*. New York: McGraw-Hill Book Co., Inc. (1962).

15. Morlan, John E. *Preparation of Inexpensive Teaching Materials*. San Francisco: Chandler Publishing Co., Inc. (1963).

As indicated by the titles, these three books deal with the planning and production of instructional materials with emphasis on local production techniques by classroom teachers. All include sections covering mounting and preserving, lettering, preparation of materials for projection, and sources of materials and equipment. Morlan's work has an excellent section on 3-D materials such as displays, maps, models, mockups and scroll theaters, while Minor has sections on visual, color and texture techniques. Kemp's book rounds out the series with comprehensive sections on planning for production and photographic production skills needed for the production of slides, filmstrips, overhead transparencies, motion pictures, and television materials.

LANGUAGE LABORATORIES

16. Hocking, Elton. *Language Laboratory and Language Learning.* Washington, D. C.: Department of Audiovisual Instruction of the NEA (1964).

This book is for teachers of foreign languages and audiovisual specialists, whose partnership is stressed throughout the work. The opening sections include chapters on the history of the language laboratory and a review of current theory and practice. The remaining chapters report on three symposiums. The first symposium reviews the status of current research, the second notes the achievements and prospects of the language laboratory, and the third explores the relationship between the instructional technology and the language laboratory. Extensive appendices cover such topics as the new technical developments, representative language laboratory installations, approaches to teaching foreign languages in the elementary school, a sketchbook of architecture and equipment for the language laboratory, and a selected bibliography.

INSTRUCTIONAL TELEVISION

17. Diamond, Robert M. (Editor). *A Guide to Instructional Television.* New York: McGraw-Hill Book Co. (1964).

Designed primarily for administrators and television teachers, the work includes sections on "single-room television," studio television for both open- and closed-circuit distribution, administrative uses of television, and television in perspective. All areas covered include numerous examples of actual situations. In "Part IV--The Perspectives for Instructional Television," the editor candidly explores the problems and potential of the medium. The reader should not overlook the appendices which include practical information on nurturing ITV, planning for TV, and evaluating programs. A glossary and an annotated bibliography are also included.

PROGRAMMED INSTRUCTION

18. Lange, Phil C. (Editor). *Programed Instruction:* 1967 Yearbook of the National Society for the Study of Education - Part II. Chicago: The National Society for the Study of Education (1967).

The yearbook is a recent addition to the literature of programmed instruction. It was written at a time when the development of the programming movement was mature enough for a critical review of its past and a rational consideration of its future. Section one reviews the foundations of programmed instruction, its history and theoretical base. Section two reviews the theory and mechanics of program design, construction and evaluation. Section three is devoted to the issues and problems confronting programmed learning. Topics discussed in the issues section include administrative and curricular considerations, program production problems, application of programmed instruction in the schools, machine teaching, and future developments. Lange's chapter on future development in programmed instruction provides a particularly insightful and thought-provoking analysis of the issues and problems now facing instruction.

(Note: A separate bibliography on programmed instruction, by Robert Glaser and Mary Louise Marino, was commissioned by and is available from the ERIC Clearinghouse at Stanford University.)

COMMUNICATION THEORY

19. Ball, John and Francis C. Byrnes (Editors). *Research, Principles and Practices in Visual Communication.* Washington, D.C.: The Department of Audiovisual Instruction of the NEA (1960).

Agricultural extension specialists have been concerned about effective diffusion of ideas and innovations for many years. This manual developed for the Communication Training Program by the National Project

in Agricultural Communications is designed for those individuals who will be designing both oral and written communication. This well-written work includes basic communication theory, the research on planning and design of audiovisual communication, and the administration and evaluation of visual communications programs.

Heavy emphasis is placed upon giving the reader a clear understanding of several communication models. Included in the chapters on communication models is Gerbner's Interaction Model and Berlo's S-M-C-R and Interpreter Models plus shorter descriptions of several other models. The book provides many practical suggestions for designing and evaluating audiovisual messages. These practical suggestions will be especially useful to audiovisual communications specialists who often find the communications area heavily theory oriented.

20. Berlo, David K. *The Process of Communication.* New York: Holt, Rinehart and Winston, Inc. (1960).

This book is concerned with the ways people communicate. It includes the scope and purpose of communication, the factors involved in the process, and the role of language in human communication. Exploring the complex nature of the communication process, it identifies and describes factors affecting communication and its results. In describing the process of human communication Berlo develops several useful models of communication.

The first, called the S-M-C-R Model, is used to illustrate the ingredients of the communication process, and the second, the Interpreter Model, shows the relationship between communication and meaning. Berlo then explains the role of communication in social systems and analyzes the problem of communication breakdown. He concludes the work by exploring the dimensions of meaning and describes ways of specifying and measuring meaning. This book is valuable because it provides a framework for studying basic problems.

LEARNING THEORY

21. Gagne, Robert M. *The Conditions of Learning*. New York: Holt, Rinehart and Winston, Inc. (1965).

In this work Gagne draws together what is known about the process of learning so that it can be used in designing improved instruction. He identifies eight classes or types of learning: 1) signal learning, 2) stimulus-response learning, 3) chaining, 4) verbal association, 5) multiple-discrimination learning, 6) concept learning, 7) principle learning, and 8) problem solving. He discusses each type in detail, provides examples, and cites the work of learning theorists who have done basic research on each type of learning.

These eight types of learning are then related to problems of instructional design and educational decision making. Audiovisual communication specialists will be especially interested in a chapter titled "Resources for Learning," which discusses media for instruction and various modes of instruction. Many pertinent learning theory references are cited.

(Note: A separate bibliography on learning theory, by Ernest Hilgard, was commissioned by and is available from the ERIC Clearinghouse at Stanford University.)

RESEARCH

22. Lumsdaine, A. A. "Instruments and Media of Instruction" in the *Handbook of Research on Teaching*. N. L. Gage (Editor). Chicago: Rand McNally & Co. (1963), pp. 583-681.

This chapter on the research on instructional media aims: 1) to help the educational researcher sharpen and more carefully delineate his problems, 2) to analyze the current status of research in the major problem

areas, 3) to examine the research methodologies and techniques in order to improve future research designs. No attempt is made to review all studies but rather to select those which have explored key variables in audiovisual instruction.

Lumsdaine's review of instructional media research methodology is comprehensive and critical. It includes many suggestions for the improvement of research designs. He suggests many variables and specific factors which need further study. The status of such factors as active student response, stimulus control in presentation of material, content and organization of instruction, verbal factors in instruction, motivation, incentive and interest are reviewed. An extensive reference list concludes the chapter.

New Teaching Aids for the American Classroom. Copyright, 1960 by Institute for Communication Research, Stanford University. Washington, D.C.: U.S. Government Printing Office - OE-34020 (1962).

This report on the symposium on the state of research in instructional television and tutorial machines held in November, 1959, at the Center for Advanced Study in the Behavioral Sciences, includes ten authoritative papers on the introduction and use of technology in education. A wide range of topics are covered. Tyler and Hall look at the problems of educational media in the classroom of tomorrow. Hilgard presents learning theory and its applications while Riley and Riley explore the sociological perspectives on the use of educational media. Schramm reports on the implications of television in the life of the child. Carpenter and Hoban examine television and film research, with Lumsdaine noting the development of teaching machines and programmed learning. Several papers, Riley and Riley, Carpenter, and Hoban, introduce and use the systems approach.

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