

A STUDY OF BELIEF SYSTEMS AND
ACCEPTANCE OF NEW EDUCATIONAL
MEDIA WITH USERS AND NON-USERS
OF AUDIOVISUAL GRAPHICS

Thesis for the Degree of Ph. D.
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DeLayne R. Hudspeth
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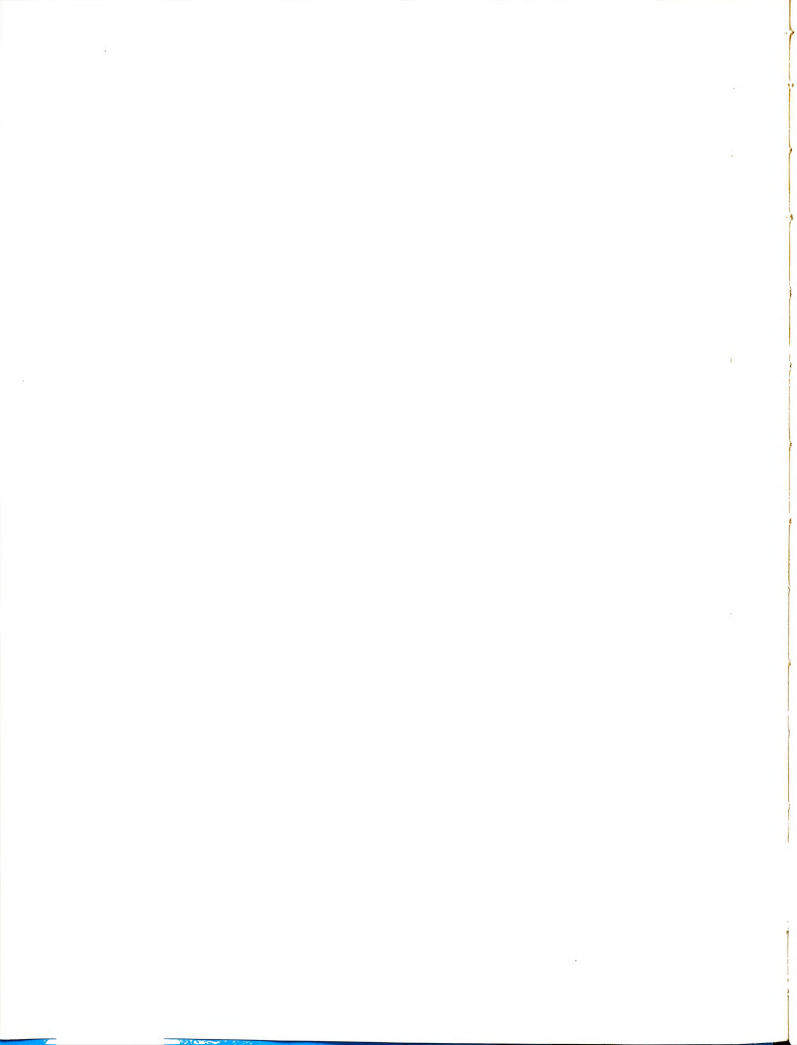
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ABSTRACT

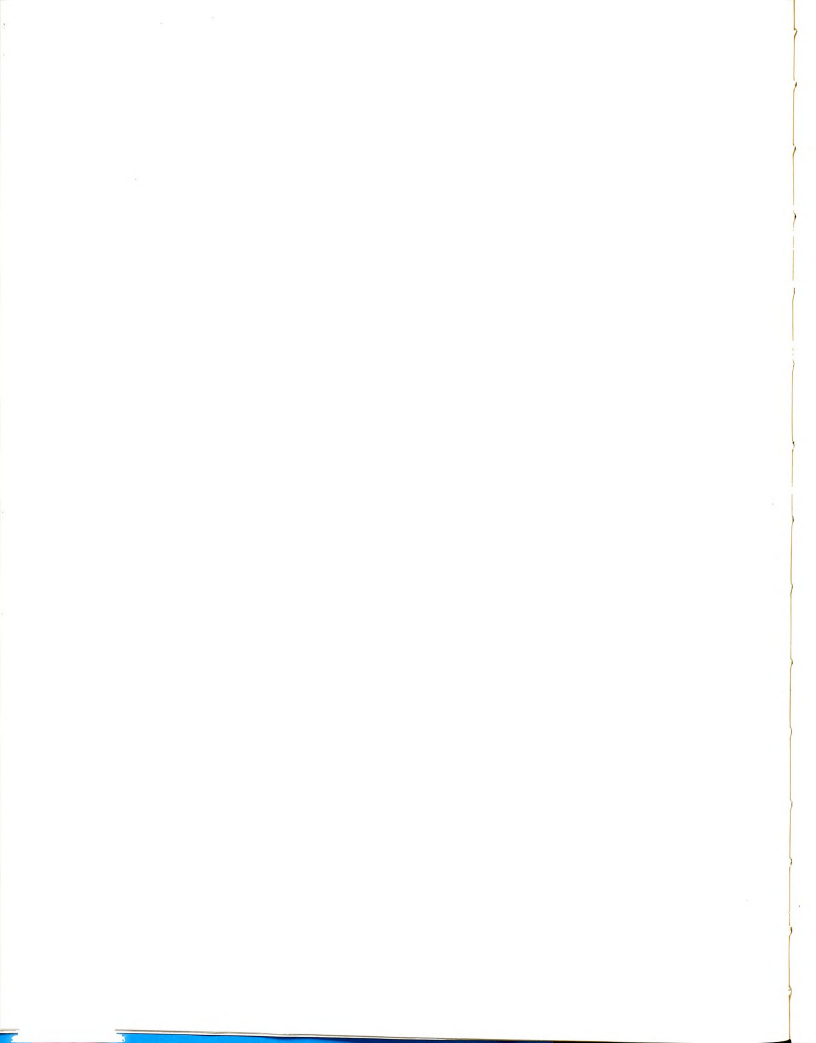
A STUDY OF BELIEF SYSTEMS AND ACCEPTANCE OF NEW EDUCATIONAL MEDIA WITH USERS AND NON-USERS OF AUDIOVISUAL GRAPHICS

by DeLayne R. Hudspeth

This study examined the relationship between two constructs: open- and closed-mindedness and attitude toward educational media. Hypotheses were tested for evidence that faculty who are open-minded, and faculty who hold a favorable attitude towards the use of media, act differently in the teaching process than those faculty who are closed-minded and who do not view media with a favorable attitude.

Three hypotheses were formulated:

- H₁: There will be a correlation between belief system scores indicating "open-mindedness" and media attitude scores which indicate "favorable" attitude toward the use of media in education.
- H₂: Faculty members who use graphics in the teaching process will be more open in their belief systems than similar faculty who do not use graphics in teaching.

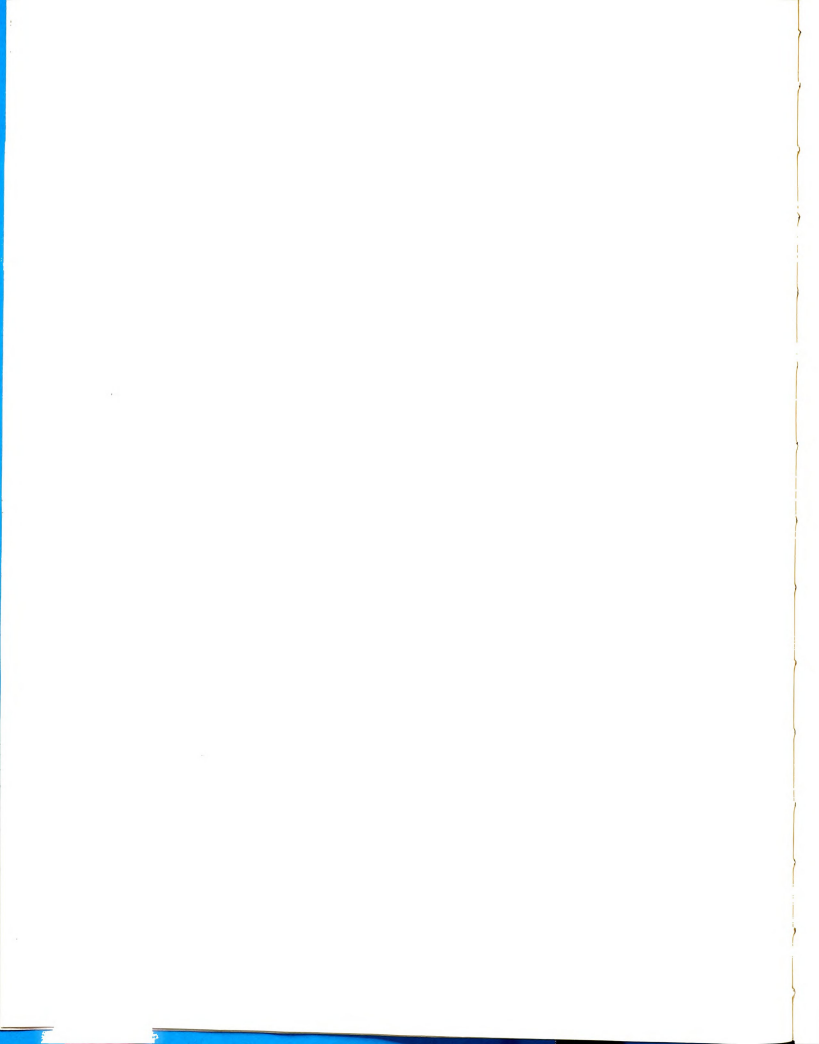


H₃: Faculty members who use graphics in the teaching process will have a more favorable attitude toward educational media than similar faculty who do not use graphics in teaching.

The study made use of two faculty groups. One group, identified as users of graphics, was selected from the total population of faculty teaching at least nine credit hours during the academic year who were billed for graphics services during the fiscal year, 1963-64, by the AV Center at Michigan State University. Members of the user group were also identified as to department, rank, age, highest degree held, length of service at Michigan State University, and percentage of teaching at the graduate or undergraduate level.

The second group consisted of faculty members matched with the user group on the above criteria except that these faculty had used graphics in teaching less than ten times during the 1964-65 academic year. Faculty of both groups were given three instruments: The Rokeach Dogmatism scale, the New Educational Media Attitude inventory, and a questionnaire designed to obtain data about the samples.

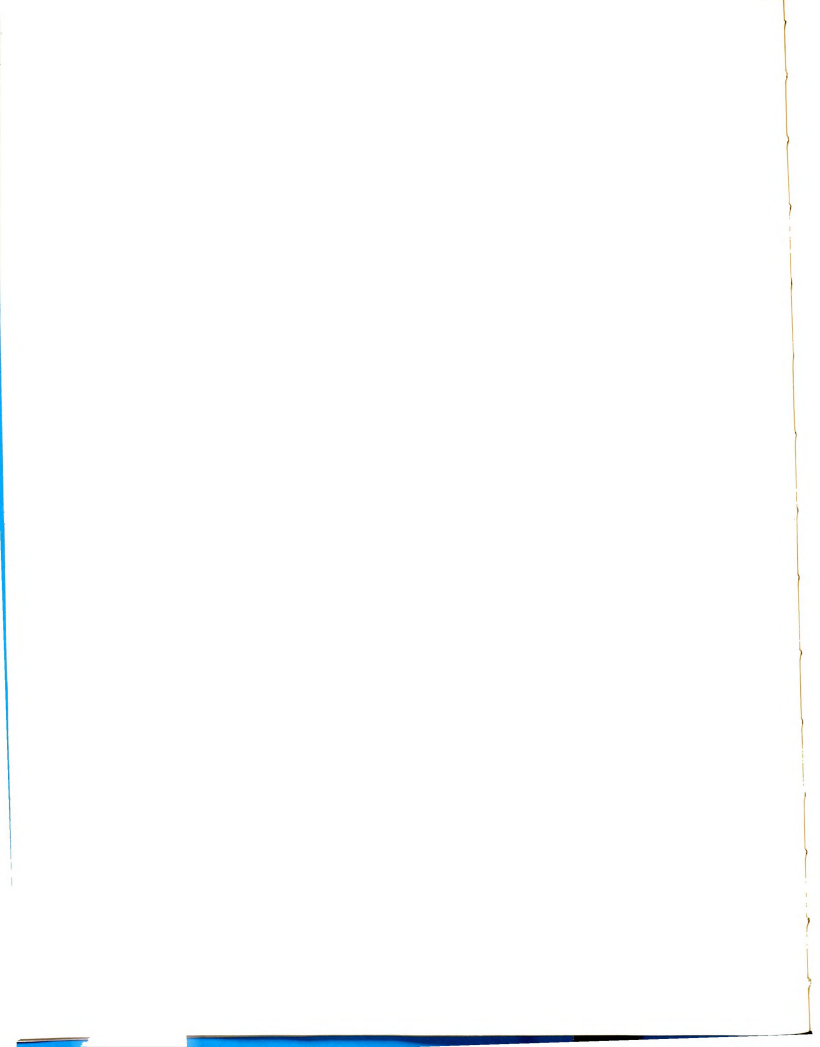
The first hypothesis dealt with the correlation of belief systems with attitudes toward educational media. It was predicted that faculty open-minded in their belief



systems would tend to be favorable in their attitudes toward educational media. This was found to be true to the extent that scores from the belief system instrument correlated with scores from the educational media attitude instrument.

The second hypothesis stated that those faculty who were identified as users of graphics would be more open in their belief systems than similar faculty who do not use graphics. The null of this hypothesis could not be rejected.

The third hypothesis dealt with attitudes toward educational media by the two groups of faculty. It was predicted that those faculty using graphics would have a more favorable attitude toward all educational media than faculty not using graphics. The data clearly supported this hypothesis.



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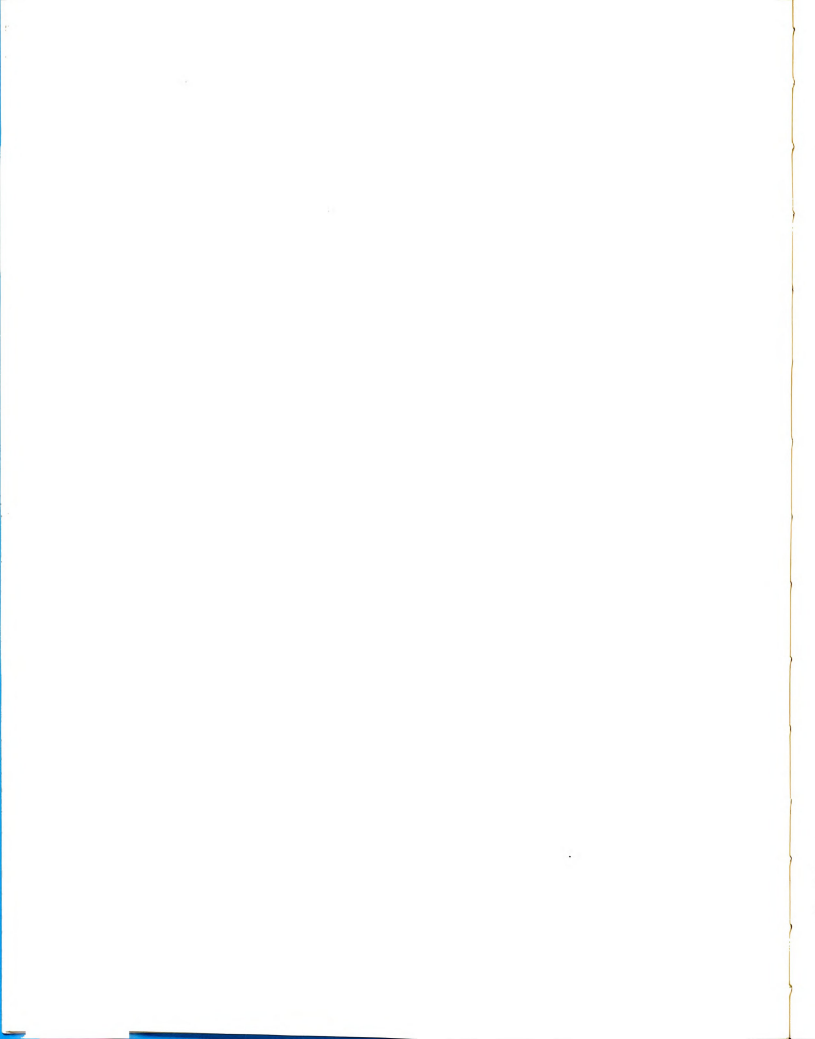
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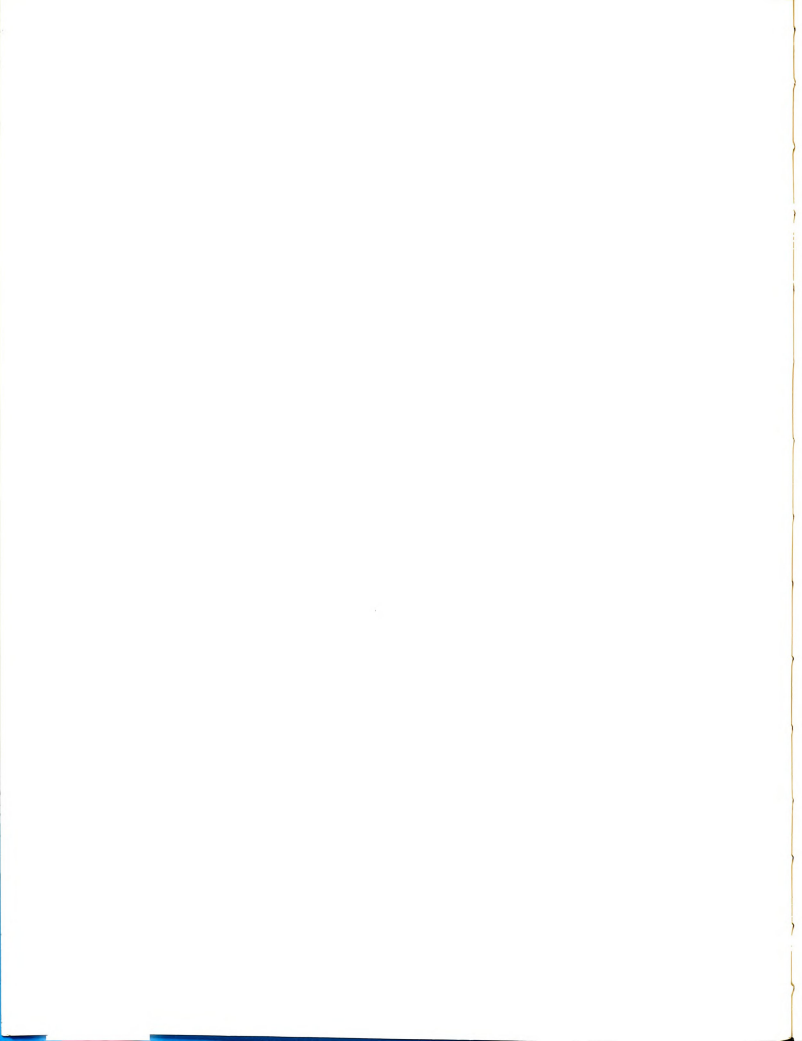


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A number of people deserve thanks for their support in the writing of this dissertation. This group ranges from the faculty at Michigan State University who had the kindness to cooperate on the study, to colleagues who alternately played the role of devil's advocate, or offered sympathy, whichever seemed needed.

The first I would like to single out for thanks is Dr. Charles F. Schuller, my advisor. His patience, friendship, and guidance supplied an essential role in my growth as a student of technology. Dr. Schuller also made it possible for me to pursue doctoral studies in Educational Media as a Fellow of the National Defense Education Act. I would also like to thank Dr. Cole S. Brembeck, Dr. William A. Faunce and Dr. Ted W. Ward for their assistance as members of my committee.

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A special tribute must be given to my wife, Odette, for the many patient hours she spent as a dissertation widow. Her faith has been of great help in maintaining the perseverance needed to complete the degree.

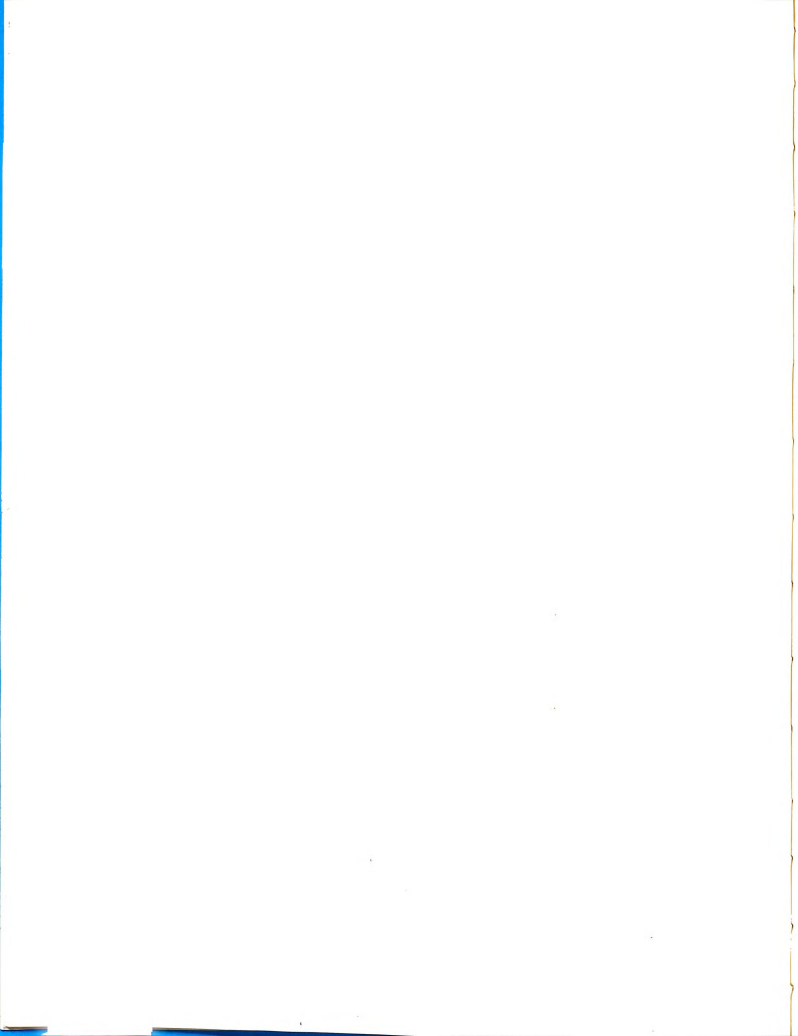
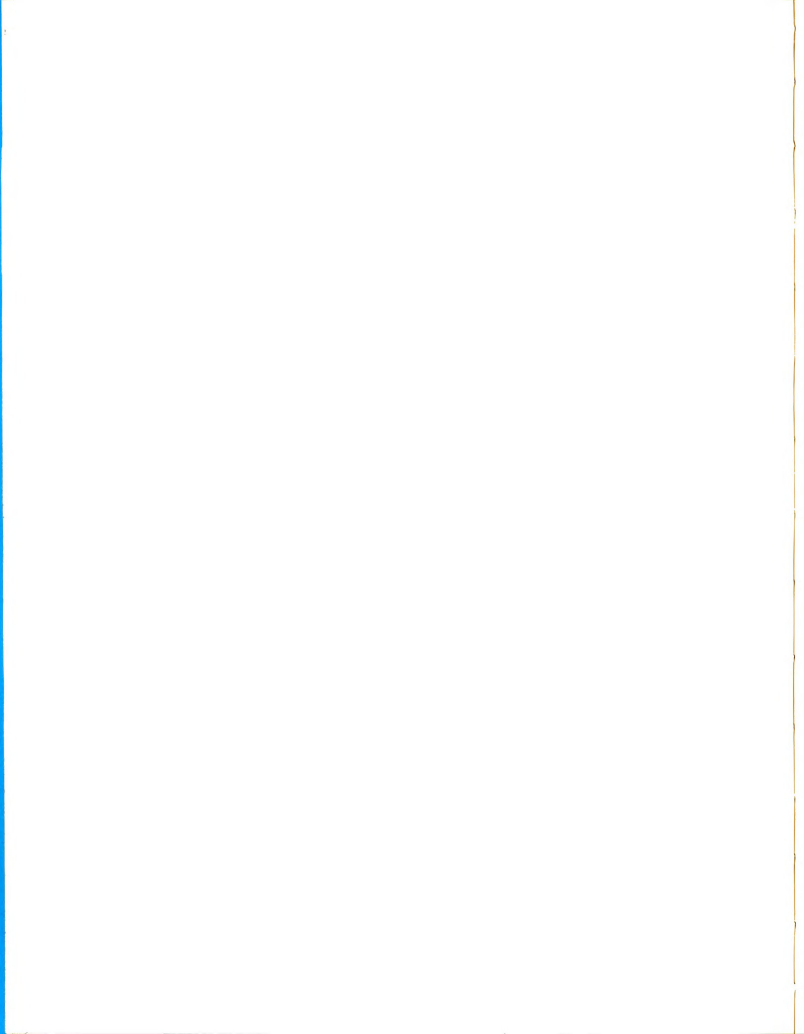


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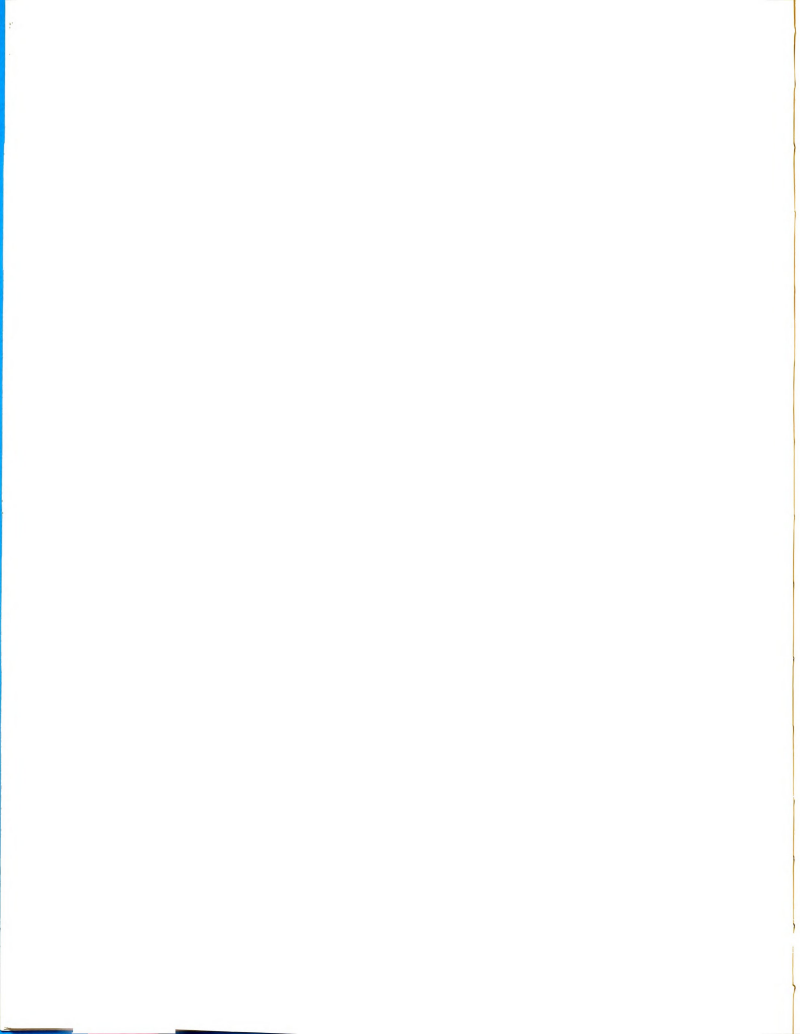
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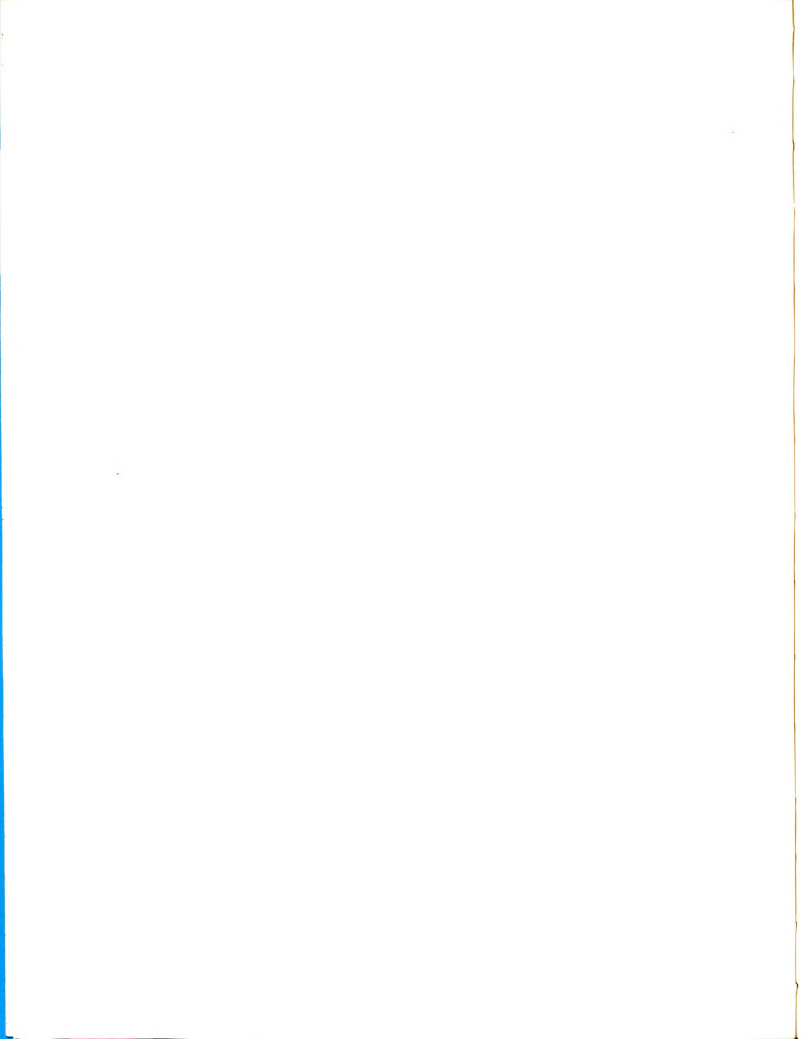
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Chapter I

THE PROBLEM

The Need for the Study

Modern historians of technology such as Oliver¹ emphasize the fact that American civilization is fundamentally a technological civilization. As such, technology is not to be confined to industry and science, and is seen more and more clearly as a force affecting values in the social sciences. This force is seen with increasing clarity in education as pressures from both within and without the educational system cause imbalances in the traditional educational setting.

This is perhaps more true in education than in other segments of our society due to tradition and to the present operating pattern where "the heart of educational practice, at least in its present form, is the instructional group".² The results of these pressures has been an increased awareness on the part of some educators for broader vision and a need to utilize more efficient ways of accomplishing the

¹J. W. Oliver, History of American Technology, New York: Ronald Press, 1956.

²Gale Jensen, "Introduction: The Newcomer," The Dynamics of Instructional Groups, N. B. Henry, editor (Chicago, The University of Chicago Press, 1960), p. 4.

educational tasks.

As the pressures of technology become even greater it becomes imperative that educators assume leadership for the effective use of new educational tools. The use of new tools and new systems assumes an ability on the part of an educator to clearly identify those components of the systems which might be more efficiently organized to produce desired outcomes. This, of course, includes the human component and its reaction and interaction with the other parts of the system.

Given the fact that institutions will face an increasing amount of pressure to use technological tools, it becomes necessary to identify those individuals and groups who will entertain new processes and who will engage in the kind of activities that advance the practice of teaching and learning.

The successful use of innovations in the teaching-learning process assumes a staff of people who are open to continuous examination of their role. They must be open to the possibility that this role may change with time and with the insertion of new kinds of energy.

Two areas of research are suggested in light of the need to identify people who can act in an open-minded manner. The first of these is a study of belief systems which attempts to measure the "open" or "closed" mindedness

of an individual.

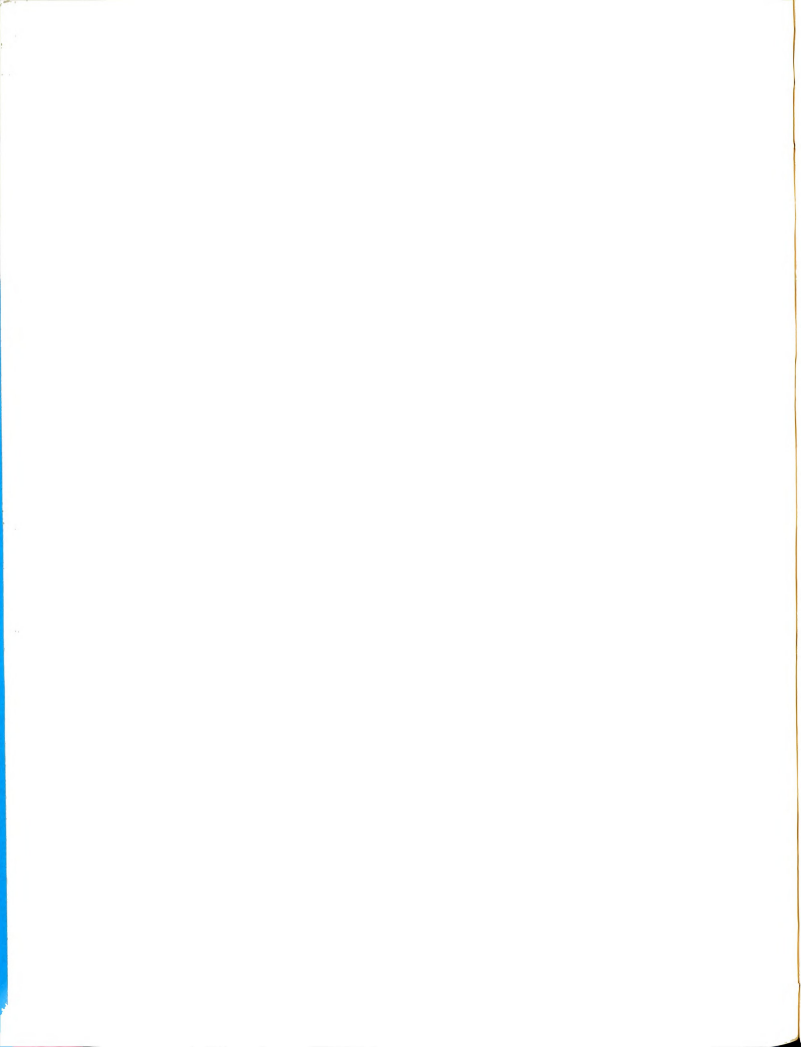
The work of Rokeach will be explained in detail in Chapter II, but essentially his research involves looking at belief systems of individuals related to the way in which a "person's system is open or closed; namely, the extent to which the person can receive, evaluate, and act on relevant information received from the outside on its own intrinsic merits, unencumbered by irrelevant factors in the situation arising from within the person or from the outside."³

If such open-minded people can be identified, then such persons are the most likely candidates for the successful use of new technologies. Such an open-minded person is necessary if it is assumed that technological practices can be either good or bad and that the best use of new tools and systems in the initial exploratory stage will depend upon criteria which must be evaluated "unencumbered by irrelevant factors."⁴

However, the faculty of a major university will include people holding belief systems both open and closed. The practical question, when the problem of innovation diffusion is faced, becomes that of trying to predict where within

³Milton Rokeach, The Open and Closed Mind, New York: Basic Books, Inc., 1960, p. 57.

⁴Ibid., p. 57.



the faculty the greatest profit will occur when the dissemination of ideas becomes systematized. In the media field the question becomes that of trying ^{to} ~~of~~ identify those who are sympathetic towards the use of media technology in the teaching-learning process.

An instrument developed for this purpose was designed originally by Ramsey⁵ and later modified by Guba and Snyder.⁶ The New Educational Media Acceptance Inventory (NEMA) was designed to assess the degree and amount of unfavorable or sympathetic attitudes toward the more commonly used media. A detailed explanation of this instrument will be found in Chapter II, but essentially the NEMA was designed to help an instructional supervisor or curriculum consultant "know the exact nature of resistance to the use of new educational media by teachers in the instructional program."⁷

The present study attempts to determine whether measures

⁵ Curtis Paul Ramsey, A Research Project for the Development of a Measure to Assess Attitudes Regarding the Uses of New Educational Media. Title VII, Project Number 492, National Defense Education Act of 1958, Grant Number 740095, Nashville, Tennessee: George Peabody College for Teachers, December, 1961.

⁶ Egon G. Guba and Clinton A. Snyder, Research and Evaluation on MPATI Telecasts, Final Report, RF Project 1367, Research Foundation, Columbus, Ohio: Ohio State University, April, 1964.

⁷ Ramsey, op. cit., p. 2.

of belief systems and attitudes towards new media can be used to identify individuals who are able to work effectively with new and pressing technologies of education. To see in fact if the instruments could be used in this way, a group of teachers known to have used certain educational tools were given the evaluation instruments and their responses were compared to faculty who have not used these tools.

The tools under consideration for this study are those graphics which can be used in the classroom. This includes slides, charts, filmstrips, posters, graphics and overhead transparencies. Excluded are the chalkboard and the 16mm film.

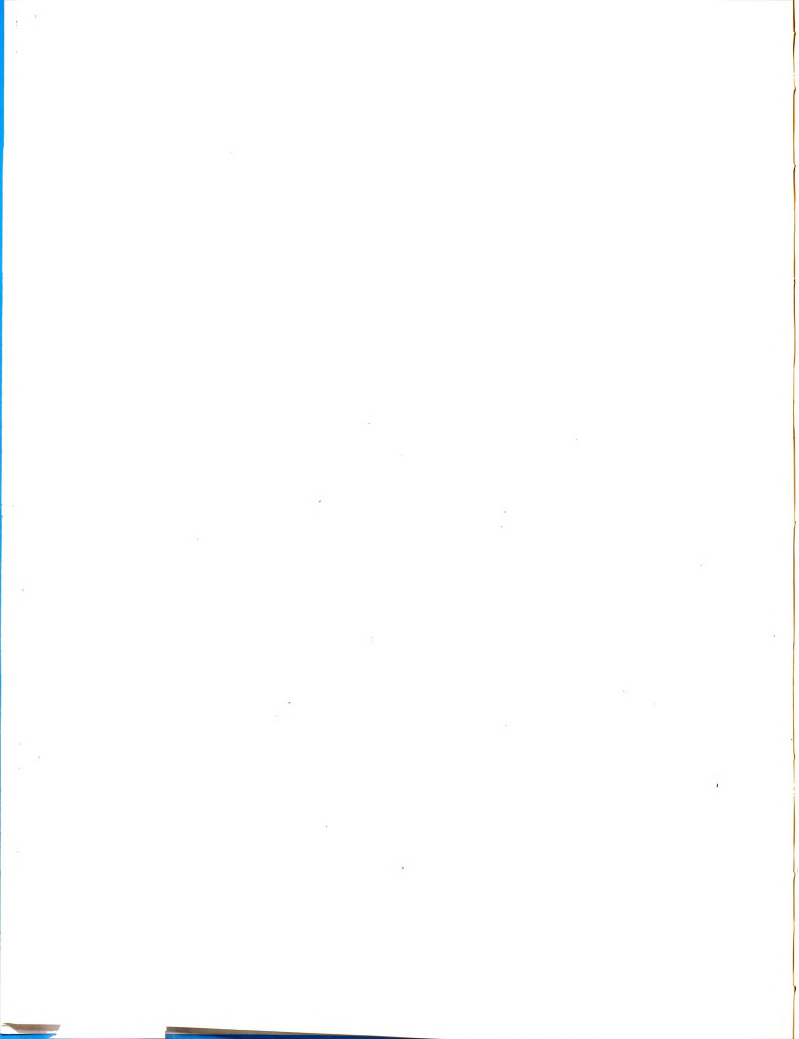
The Purpose of the Study

The purpose of the study will be to see if teachers who use certain of the media in the teaching-learning process are different in their responses to the Dogmatism scale⁸ and to the New Educational Media Attitude Inventory scale⁹ than similar teachers who do not use media.

Evidence from such research might be used in several

⁸See Appendix I for a copy of the instrument used.

⁹See Appendix II for a copy of the instrument used.



ways for the innovation diffusion process. Although the theory will be developed in Chapter II, it is suggested that such evidence could be used where specific innovations were to be introduced into the teaching-learning situation. These innovations could range from the relatively simple overhead projector (used by instructors at the point of student contact), to the more complex use of CCTV where much greater cooperation must exist and where persons outside the classroom become involved in the instructional process. A more detailed examination of these possibilities will be found in Chapter V.

A secondary, but equally important, outcome of the study is further validation of the NEMA scale. As Ramsey points out, "A fruitful area of research would be to attempt to correlate attitude assessment findings (of NEMA) with critical incidents or behavioral phenomena. . ."¹⁰ This will be done by comparing scores on the NEMA scale with use of media by faculty. It is reasonable to assume that faculty using media will have a more favorable attitude toward the use of media and this should be reflected in the NEMA score.

More specifically this study will attempt to answer the following questions:

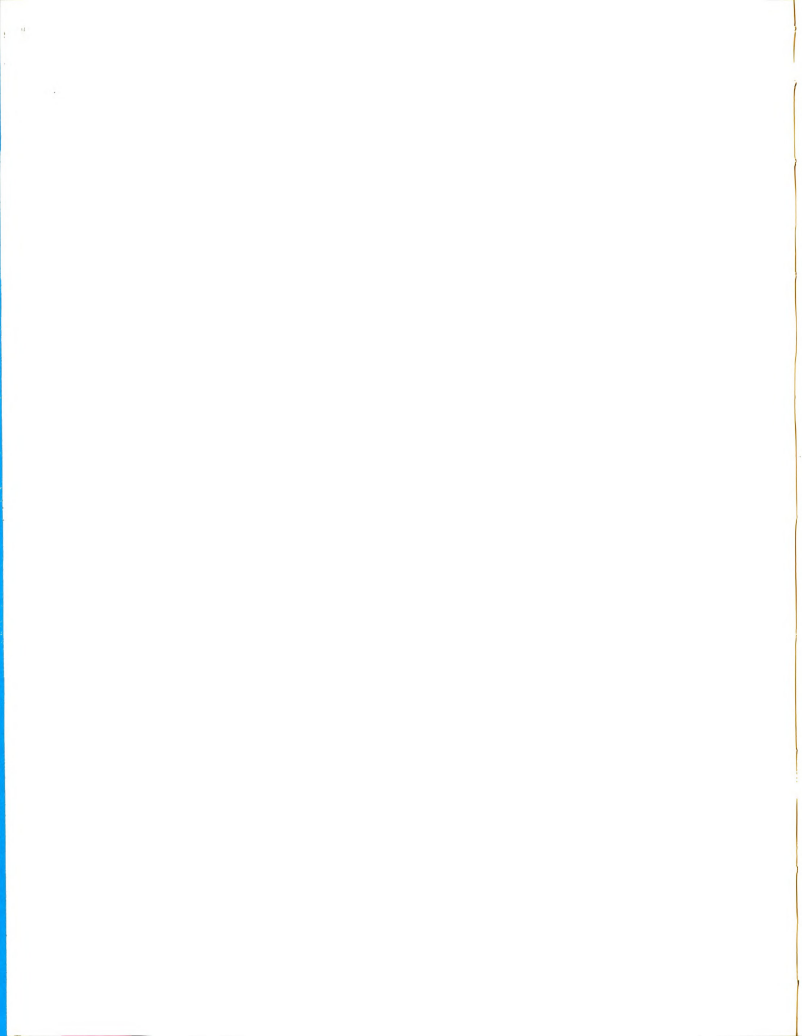
¹⁰Ramsey, op. cit., p. 2.

1. Is there a relationship between faculty members who score "open-minded" in a belief system measure and those who score "favorable" toward the use of new educational media?
2. What is the relationship of scores obtained on a measure of "open-closed belief system" for faculty members who use graphics in teaching and for similar faculty who do not use graphics?
3. What is the relationship of scores obtained with the New Educational Media Attitude scale, for faculty members who use graphics in teaching and for similar faculty who do not use graphics?

The Hypotheses

The hypotheses to be tested in this study are:

- H_1 : There will be a correlation between belief system scores indicating "open-mindedness" and media attitude scores which indicate a "favorable" attitude towards the use of media in education.



H₂: Faculty members who use graphics in the teaching process are more open in their belief systems than similar faculty who do not use graphics in teaching.

H₃: Faculty members who use graphics in the teaching process will have a more favorable attitude towards the use of media as indicated by the New Educational Media Attitude scale than similar faculty who do not use graphics in the teaching process.

Definition of Terms

The following is a definition of terms which will be used in this study:

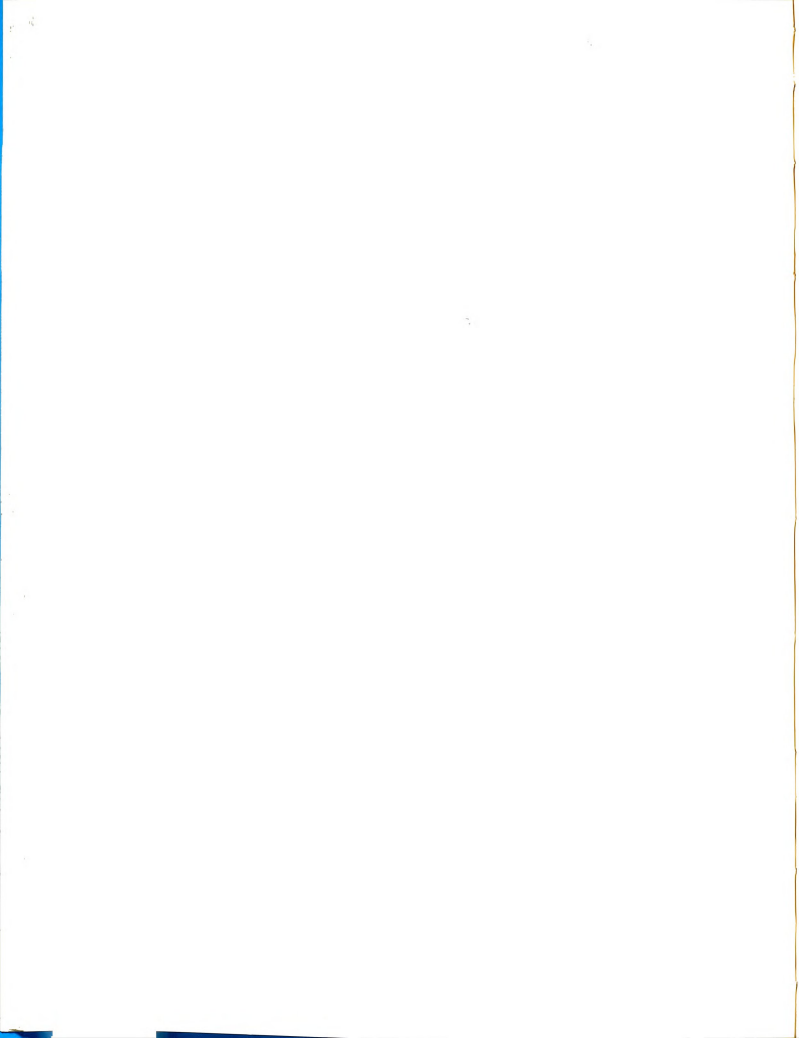
Open belief system faculty:

A faculty member who scores below the mean on the Rokeach Dogmatism scale.¹¹

Closed belief system faculty:

A faculty member who scores above the mean on the Rokeach Dogmatism scale.

¹¹Scoring on this instrument is such that a low score indicates openness in the belief system.



Faculty with favorable attitude toward educational media:

Faculty who score below the mean on the New Educational Media Attitude Inventory.¹²

Faculty with unfavorable attitude toward educational media:

Faculty who score above the mean on the New Educational Media Attitude Inventory.

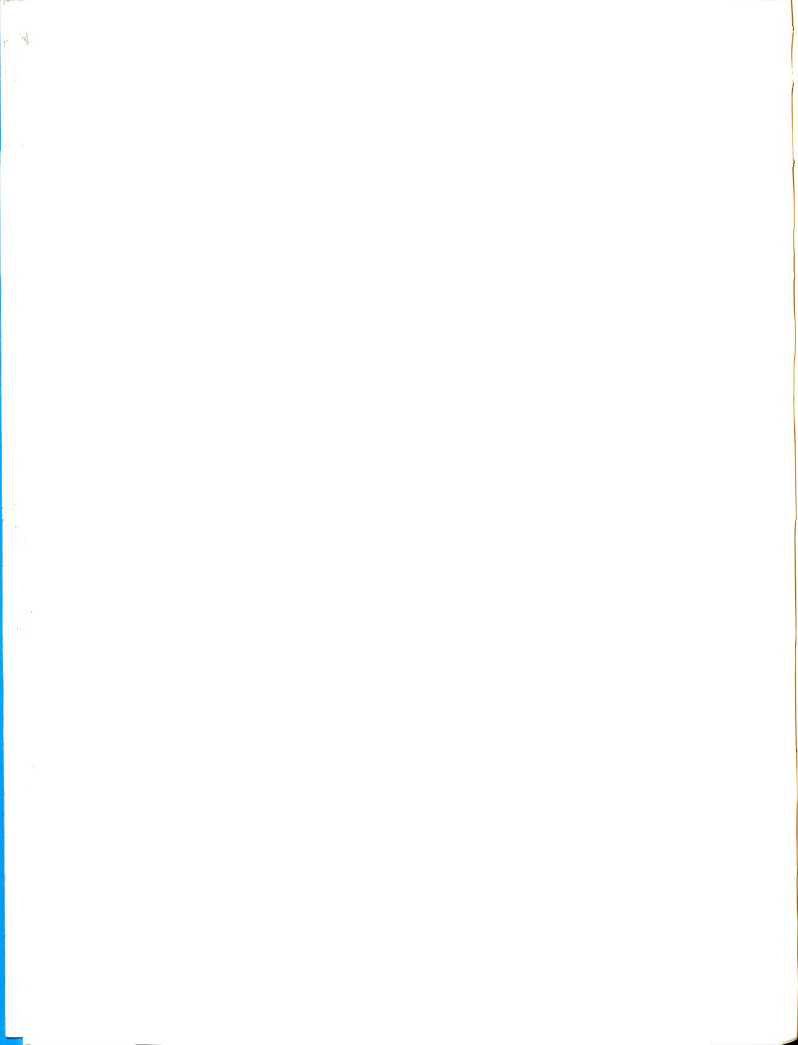
Faculty who are users of graphics in the teaching-learning process:

Faculty who have used graphics in teaching ten or more times during the 1964-65 academic year. Such faculty will have had teaching responsibility for at least nine credit hours.

Faculty who are non-users of graphics in the teaching-learning process:

Faculty who have used graphics less than ten times during the 1964-65 academic year. Such faculty will have had teaching responsibility for at least nine credit hours.

¹²Scoring on this instrument is such that a low score indicates a favorable attitude toward educational media.



Plan of the Study

As this study deals with users of technology in teaching, it was decided that the group chosen for examination would include those faculty on campus who were actively using teaching tools. Because of data availability concerning the activity of faculty, an arbitrary category of technology users was chosen called "users of graphics".

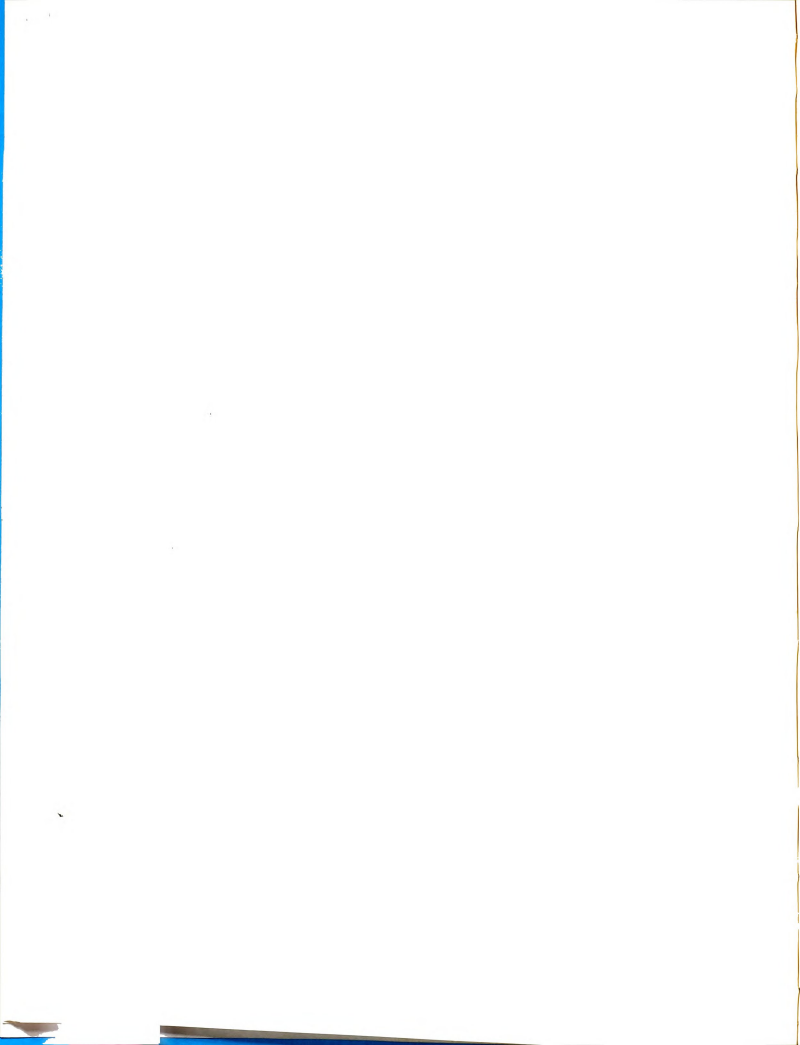
The initial list of users was obtained from the 1963-64 Audiovisual Center records. These were faculty who had obtained materials and/or services and who had been billed. Subsequently this list was checked against a record of the faculty load for the 1963-64 academic year and any faculty member not having a teaching load of at least nine hours was eliminated from the list of users.

This list was then checked against the 1965 faculty list to eliminate names of those who had left the faculty.

A similar population of faculty was drawn from the remaining names based upon department affiliation, age, rank, length of service at Michigan State University, and latest degree obtained. This population would act as the comparison group for the hypotheses to be tested.

As a final check to be sure that faculty were actually users or non-users of graphics, a short questionnaire was administered before the two principal instruments were given.

The function of this questionnaire was to identify faculty as to whether or not they were graphics users, obtain data concerning faculty attitude toward the efficiency of the graphics department, and finally, to check against obvious biases which would skew the distribution of scores.



Chapter II

REVIEW OF THE LITERATURE

The Nature of Technology

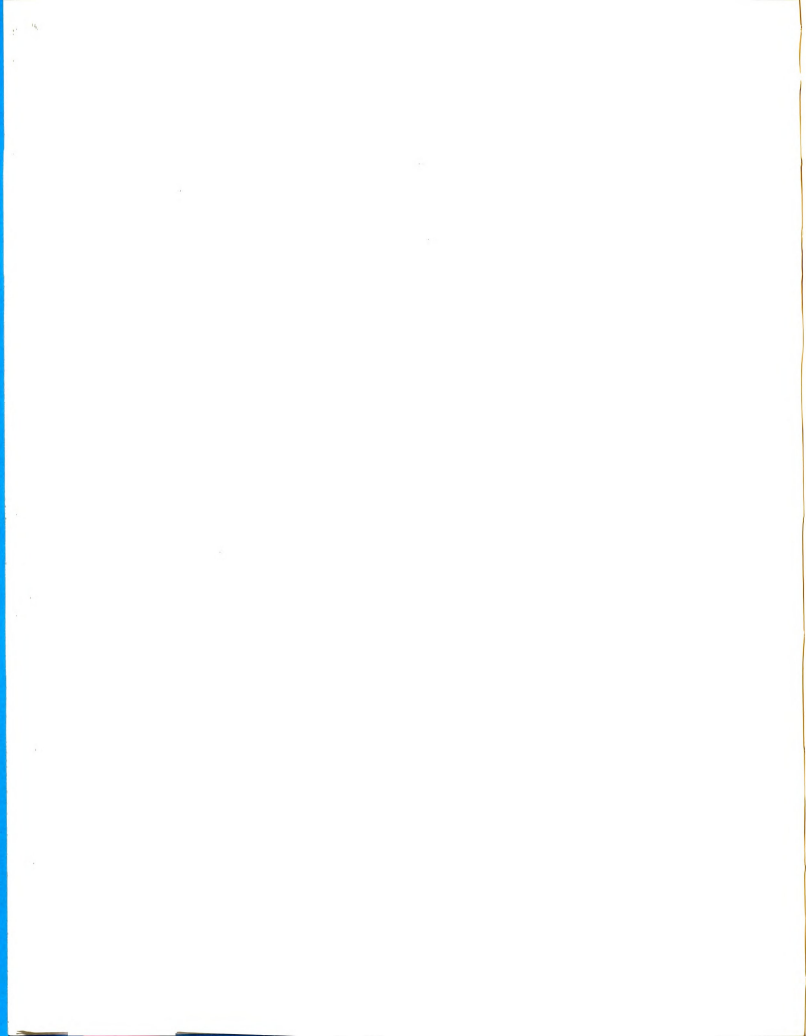
The use of technology in education is a fairly recent phenomenon. While education must take its place with other segments of American society that use technology (medical, social, media, crime, to name a few) educational technology nonetheless represents a major shift in the educational pattern. Although early uses of teaching aids can be seen in the late 1700's¹, this use of materials does not constitute instructional technology.

The term technology comes from the Greek word technologia, meaning systematic treatment.² A more precise use of the term is described by Greenwood:

The term technology refers to all disciplines designed to achieve controlled changes in natural relationships by means of procedures that are scientifically based. Convention makes a sharp distinction between those

¹Charnel Anderson, Technology in American Education 1650-1900, U. S. Department of Health, Education, and Welfare, #OE-34018, Washington, D. C., 1962.

²Webster's New Collegiate Dictionary, G & C Merriam Company, Springfield, Massachusetts, 1961, p. 872.



technologists who work with material objects and those who handle human beings. The former are referred to as engineers; the latter, as practitioners. 3

Greenwood goes on to state that, "Technologists are characterized by their skill in the application of knowledge to the solution of the problems that occur to human beings."⁴

Educational technologists might then be judged on the skill they develop in the application of knowledge about teaching and learning to the solution of problems that occur to those involved in the teaching-learning process. To the extent that a teacher solves problems by means of procedures that are scientifically based, they become educational technologists.

The growing awareness that technology is making an impact on education is discussed by DeCecco:

There seems very little to which the scientific method cannot be fruitfully applied, and many individuals believe it is high time to apply it to the objectives, procedures, and materials of the school curriculum. The notion of a scientific base for education is not new, but the strengthening of the scientific milieu in which this idea is now resurrected gives it particular conviction and popularity. 5

³Ernest Greenwood, "The Practice of Science and the Science of Practice," in The Planning of Change, Bennis, Benne and Chin, editors (New York: Rinehart, Holt, and Winston, 1962), p. 74.

⁴Ibid., p. 74.

⁵John P. DeCecco, Educational Technology, New York: Holt, Rinehart and Winston, 1964, p. 11.

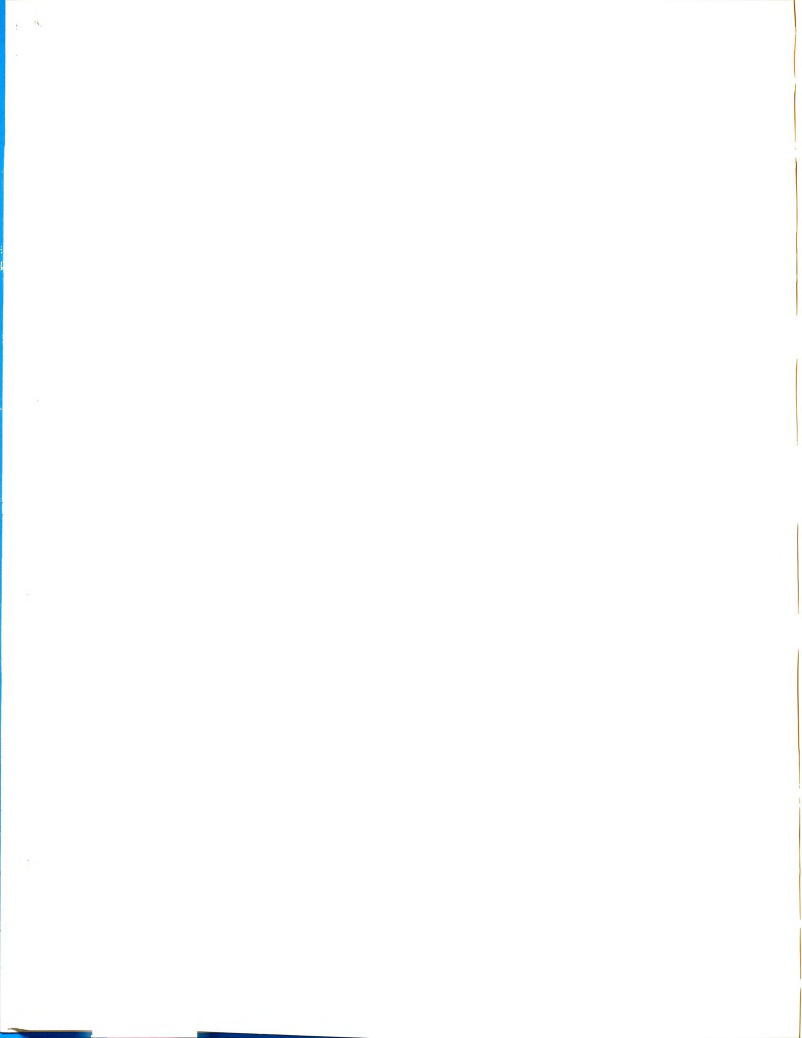
Several factors go into the view that education is just beginning a technological era. One factor is discussed by Price, in his book on the history of science, when he talks of the need for the instrument makers and the theoretical scientists to walk together.⁶

Taken in context of educational technology, this suggests that education has not had what might be referred to as "primary technology". Just as the modern house assumes primary technology in that certain services will be available such as sewage, electricity, and water, so must the technology of education assume that basic machinery, certain kinds of manpower, systems of analysis and educational materials are available.

The growth of technology in education is examined by Finn who feels that: "The American educational enterprise exists out of technological balance with great sectors of the society."⁷ Finn feels that this picture is changing, and suggests that "we 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

⁶Derek J. deSolla Price, Science Since Babylon, Clinton, Massachusetts: Colonial Press, 1961, p. 51.

⁷James D. Finn, 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, a report prepared for the National Education Association, Washington, D.C., 1962, p. 1.



the government, such as the military and scientific sectors."⁸

Finn goes on to describe several reasons for the situation mentioned above and suggests that education can be viewed as a culture in transition. He further finds that education "is now beginning the take-off stage into a high-order, high-energy culture, and that it is the first educational system in the world to reach this stage." (author's emphasis)⁹ To document the "tooling up" of this culture, he submits evidence as to the number of educational tools being used over the last three decades, and asks that "we view the build-up of audio-visual equipment and materials in education as one of the principal preconditions for a technological revolution in education . . ."¹⁰

The Science of Educational Technology

The distinction between the use of machines as technology, and the use of technology as defined above, is frequently not made. For example, the NEA report Schools for the 60's does not make this distinction:

⁸Ibid., p. 2.

⁹Ibid., p. 6.

¹⁰Ibid., p. 9.

In both new and old buildings, technological developments, such as TV, tape-recordings, teaching machines, language laboratories, films and filmstrips, already have made marked contributions to the curriculum. Their use is expected to spread widely in the future. 11

While it is true that the use of such hardware and their associated programs focuses the attention of educators on technology (" . . . controlled changes in natural relationships by means of procedures that are scientifically based")¹², a superficial examination of the way most educational materials are used suggests that this focus is not conscious and that materials are frequently misused.

This misuse is not necessarily the fault of those who design instructional materials, nor the teachers who use such materials. Travers, for example, suggests that "Up to this point in history, psychology has not had much influence on the design of audiovisual teaching materials, probably because until very recent times, the psychology of perception and learning had not advanced to the point where they had much practical advice to offer."¹³ Travers goes on to point

¹¹National Education Association, Schools for the 60's, New York: McGraw Hill Company, 1963.

¹²Greenwood, op. cit., p. 74.

¹³Robert M. W. Travers, Research and Theory Related to Audiovisual Information Transmission, Interim Report for the U.S. Department of Health, Education and Welfare, Office of Education Contract No. 3-20-003, Salt Lake City, Utah: University of Utah, 1964, p. 1.02.

out that "Within the last decade research in psychology has taken a turn which may end the impasse and which may lead to a close working association between those concerned with the design of audiovisual aids and those engaged in psychological research."¹⁴

Skinner speaks both to the point of technology being broader than machines as well as to the possibility that a true technology of instruction may emerge:

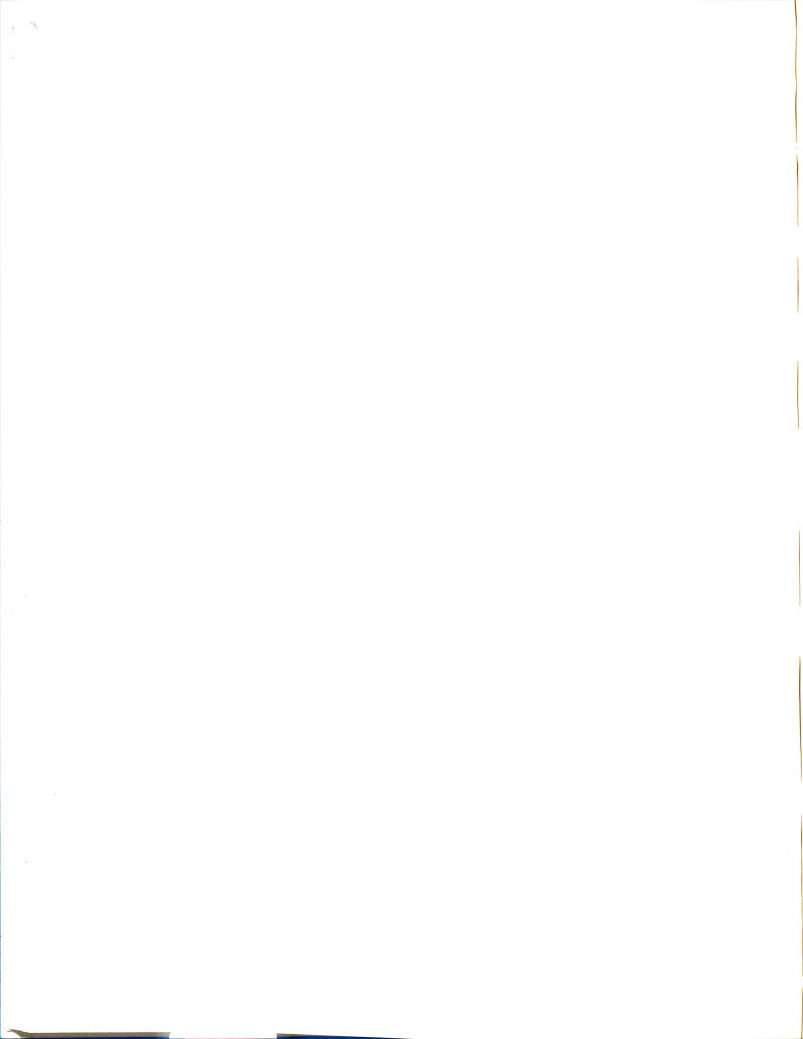
A much more effective kind of research is now becoming possible. Teaching may be defined as an arrangement of contingencies of reinforcement under which behavior changes. Relevant contingencies can be most successfully analyzed in studying the behavior of one student at a time under carefully controlled conditions. Few educators are aware of the extent to which human behavior is being examined in arrangements of this sort, but a true technology of teaching is imminent. (underlining added) ¹⁵

Systems and Educational Technology

A more accurate picture of technology emerges with the use of systems and systems analysis as these concepts infiltrate education. Miller points out:

¹⁴Ibid., p. 1.03.

¹⁵B. F. Skinner, "Why Teachers Fail," Saturday Review, Vol. XLVIII, No. 42, (October 16, 1965), p. 80-102.



In the past decade, educators have evidenced increasing interest in the use of general systems theory in the instructional process. Both the systems approach and instructional systems analysis are being studied by the education profession. (underlining is author's emphasis) 16

Although many definitions of systems may be found in the literature, the one used in this discussion comes from Ryans:

A system may be described simply as an assemblage of interdependent elements or subsystems which function together as an organized whole to yield a product unique to that assemblage. The organized functioning of the system is dependent upon orderly interaction among the component elements or subsystems made possible by information flow and control. 17

Systems are used in education to achieve stated goals or to describe an on-going process. When systems are used to solve problems and when this planned change is built upon the social values found in a society or segment of society (such as education), then technology becomes the marketplace of thought. While systems and technology are similar in that they are scientific in nature, systems and systems analysis are viewed as tools in educational technology.

¹⁶Elwood E. Miller, Instructional Systems Development, unpublished doctoral dissertation, Michigan State University, East Lansing, 1965, from first page abstract.

¹⁷David G. Ryans, Systems Analysis in Educational Planning, TM 1968, unpublished paper of the Systems Development Corporation, Santa Monica, California: July 9, 1964, p. 5.

The Nature of Change

Implied in the above discussion of technology is the nature of change. Students of technology, whether in educational media or in other areas, need to be conversant with the "application of systematic and appropriate knowledge to human affairs for the purpose of creating intelligent action and change."¹⁸ The mere insertion of technological energy into a system does not necessarily guarantee the desired results, as any AV director can testify.

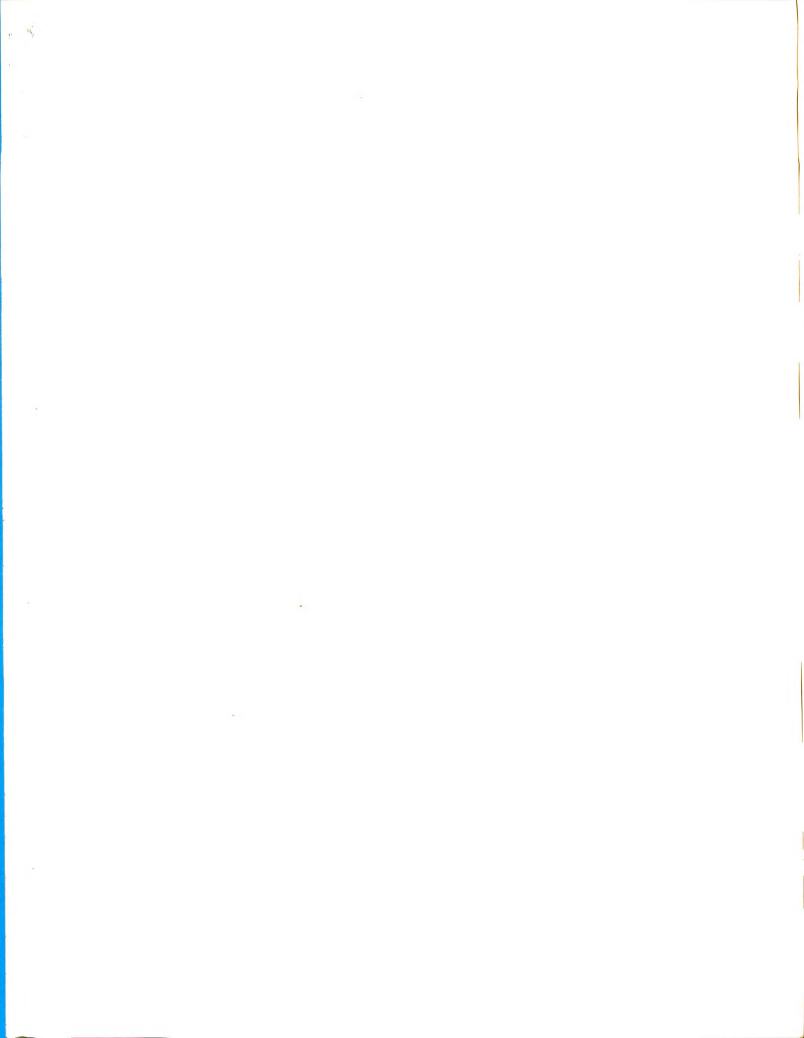
What must take place if a technological system is to be effective is a conscious strategy concerning the problems of how people function. As the authors of The Planning of Change state:

A planning approach to social change . . . has become a necessity, under conditions of contemporary culture, rather than a live option. The live options to be faced by change agents today are ancillary to this approach and center upon questions of how change should be planned and how the direction and ends of change may be validly determined. 19

In other words, it is important to study the change process qua change process so that the emerging change agents within

¹⁸Warren G. Bennis, Kenneth D. Benne and Robert Chin, The Planning of Change. New York: Rinehart, Holt, and Winston, 1962, p. 3.

¹⁹Ibid., p. 18.



and from outside education may be better understood.

The educational climate has never been a stagnate one. What education is facing is an order of change unprecedented in educational history. Brickell, for example, found that the "rate of innovation [in New York State] had more than doubled in the fifteen months following the launching of the Soviet Sputnik I in October of 1957."²⁰

The reasons for this phenomenal change rate are many and need not be documented here. Some of these factors are: population explosion, knowledge explosion, the view that education is a national resource, the use of new tools (such as the computer to study social behavior), and the insertion into education of considerable energy from outside agencies.

The traditional change process of education curriculum is described by Johnson as having six steps: (1) the program is evaluated to find specific content or skills which students are not mastering; (2) research is reviewed; (3) revisions are developed based on research findings; (4) additional equipment and materials are acquired; (5) in-service meetings are conducted; (6) the new program

²⁰ Henry M. Brickell, "State Organization for Educational Change: A Case Study and a Proposal," Innovation in Education, Matthew B. Miles, editor (New York: Bureau of Publications, Teachers College, Columbia University, 1964), p. 495.

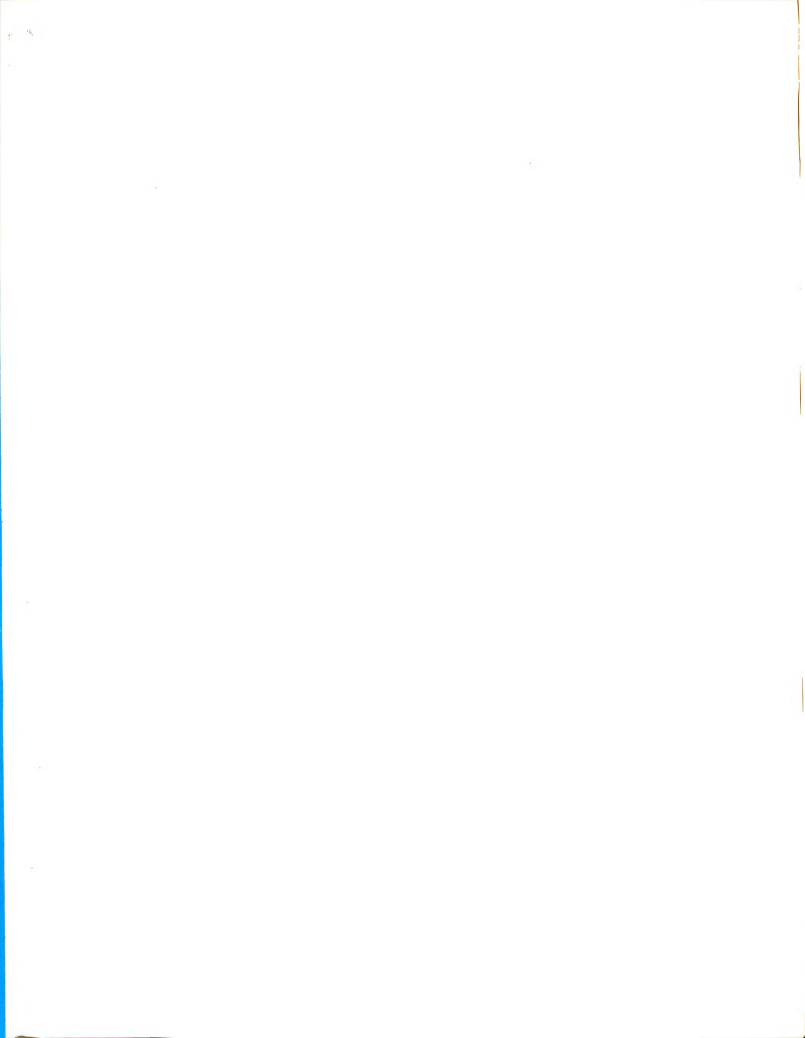
is introduced.²¹ And yet there is evidence that the traditional change process is rapidly being circumvented by those who are interested in changing both curriculum and systems of operation within education.

One of the better known examples of this circumvention involves the diffusion of the Physical Science Study Committee (PSSC) physics curriculum. While it is true that the curriculum developed by the PSSC group went through the change process described above, the later adoption of this curriculum by the schools did not, nor was there planning on the part of the PSSC that there would be. In fact, as Marsh points out: "At any rate, even if its avoidance of explicit diffusion strategy was itself a deliberate policy, the PSSC's planning remained lopsidedly national, scientific, and technological."²²

The typical diffusion of PSSC seems to start with the fifth step mentioned above (the conduct of in-service meetings) rather than with the first step (the evaluation of the program to find specific content or skills which

²¹Donald W. Johnson, "Title III and the Dynamics of Educational Change in California Schools," in Innovation in Education, Matthew B. Miles, editor (New York: Bureau of Publications, Teachers College, Columbia University, 1964), p. 170.

²²Paul E. Marsh, "Wellsprings of Strategy: Considerations Affecting Innovations by the PSSC," in Innovation in Education, Matthew B. Miles, editor (New York: Bureau of Publications, Teachers College, Columbia University, 1964), p. 251.



students are not mastering). As Marsh suggests, "The increasingly numerous teacher-training institutes, usually but by no means exclusively supported by the National Science Foundation at institutions of higher learning all over the country, were conceded to be appropriate vehicles for teaching teachers about PSSC materials."²³

However, the diffusion of PSSC did not rest solely with teacher-training institutes. Many schools adopted the PSSC curriculum without any contact with such institutes. What did seem to emerge as a major factor in the diffusion of the PSSC curriculum was that "wherever neighboring teachers have been able to see for themselves -- see PSSC supplies working in ordinary classrooms, in whatever kind of school -- adoption of the new syllabus has spread year by year."²⁴

Diffusion of Innovation

A more accurate model to explain the diffusion process, whereby the PSSC program spread to a large number of schools in a little over eight years, is one developed by Rogers. He contends that there are "four crucial elements in the

²³Ibid., pp. 261-262.

²⁴Ibid., p. 264.



analysis of the diffusion of innovations: (1) the innovation (2) its communication from one individual to another (3) in a social system (4) over time."²⁵

Rogers describes innovation as an idea which is considered new to the individual.²⁶ An innovation in education such as programed instruction is "new" in the 50's because those in education perceive this method to be a change, even though the principle was suggested by Pressey in 1926.²⁷

Once an idea exists it changes people only to the extent that it spreads from one person to another. "Thus, at its most elemental level of conceptualization, the diffusion process consists of (1) a new idea, (2) individual A who knows about the innovation, and (3) individual B who does not yet know about the innovation."²⁸

The social system as defined by Rogers is "a population of individuals who are functionally differentiated and engaged in collective problem-solving behavior."²⁹ In the

²⁵Everett M. Rogers, Diffusion of Innovation, New York: The Free Press of Glencoe, 1962, p. 12.

²⁶Ibid., p. 13.

²⁷William G. Henry, Jr., "What Makes a Teaching Machine Teach?", Audiovisual Instruction, Vol. 6, No. 4, (April, 1961), p. 126.

²⁸Rogers, op. cit., pp. 13-14.

²⁹Ibid., p. 14.

case of innovation diffusion in education it will be suggested later that one kind of differentiation of the individual is that of his belief system.

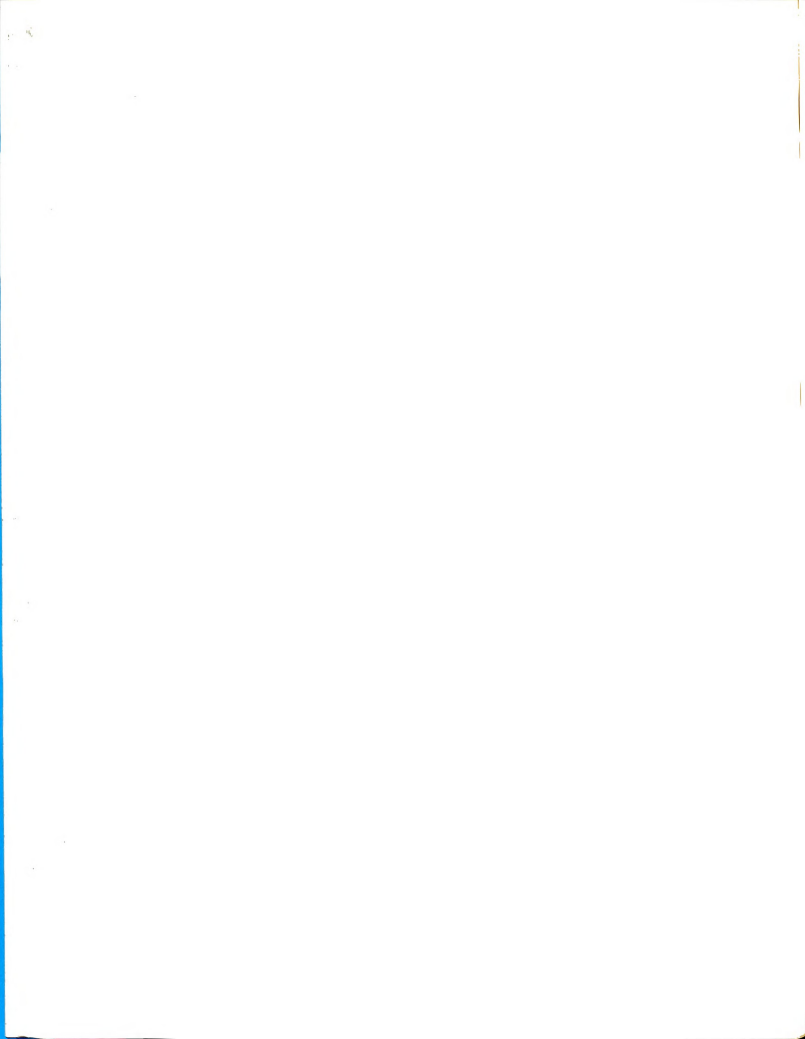
Types of adoption decisions can range from individual choice where the change that occurred affects just the person involved, to decisions made by groups of people which affect large numbers of individuals.

The importance of considering the social structure when looking at the diffusion of ideas is emphasized by Katz. ". . . it is about as unthinkable to study diffusion without some knowledge of the social structures in which the potential adopters are located as it is to study blood circulation without adequate knowledge of the structure of veins and arteries."³⁰

The last stage of the innovation diffusion process involves time. This is seen as a process whereby the person who has been exposed to the innovation shows awareness, develops an interest, evaluates the possible outcomes, gives the innovation a trial, and then adopts the innovation.³¹ Although there is some disagreement among diffusion researchers, the criteria for the difference between adoption

³⁰ Elihu Katz, "The Social Itinerary of Technical Change: Two Studies on the Diffusion of Innovation," Human Organization, Vol. 20 (1961), p. 71.

³¹ Rogers, op. cit., p. 17.



process and diffusion process accepted by this paper will be the position held by Rogers: "The adoption process differs from the diffusion process in that the adoption process deals with the adoption of a new idea by one individual while the diffusion process deals with the spread of new ideas in a social system, or with the spread of innovations between social systems or societies."³²

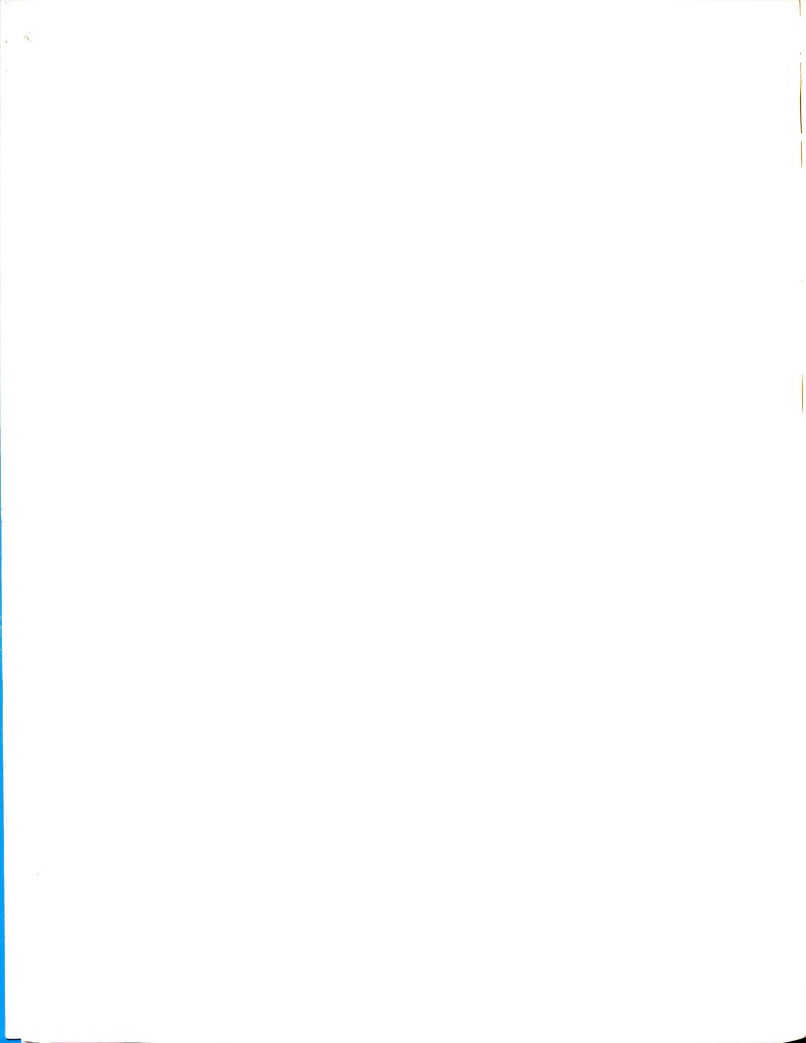
The adopter time line has been broken into five categories by Rogers based on the innovativeness of the individual or social system. "The five categories . . . are innovators, early adopters, early majority, late majority, and laggards."³³

Examination of the diffusion process whereby PSSC became the dominant physics curriculum shows that the change occurring in the physics programs across the country essentially follows the pattern described above by Rogers. Furthermore, various other new curriculums, even though diffused on a more deliberate basis, can still be seen as conforming to the basic adopter pattern.³⁴ These would include the Biological Sciences Curriculum Study (BSCS), Chemistry Study Program (CHEM), and School Mathematics Study Group (SMSG).

³²Ibid., pp. 17-18.

³³Ibid., p. 19.

³⁴For a discussion of these new curriculums see Johnson, op. cit., pp. 163-166.



These particular examples also follow Miles' strategy of innovation which considers the problem of establishing an innovation into, or by, a target system:

- (1) design - the innovation is invented, discovered, made up out of whole cloth, produced by research and development operations, etc.;
- (2) awareness-interest - the potential consumers of the innovation, that is, members of the target system, come to be aware of the existence of the designed innovation, become interested in it, and seek information about its characteristics;
- (3) evaluation - the consumers perform a kind of mental trial of the innovation, and form pro/con opinions about its efficacy in accomplishing system goal, its feasibility, and its cost;
- (4) trial - the target system engages in a (usually) small scale trial of the innovation, in order to assess its consequences. 35

One similarity between the Rogers and Miles models stands out: the focus on an individual who does or does not become a change agent, an individual who accepts or rejects an innovation. The present study begins, then, with the assumption that it is the classroom teacher who will be the pivot point in the acceptance or rejection of a new idea. Occasionally, innovation in the classroom will be

³⁵Miles, op. cit., pp. 19-20.

accepted by teachers through default.³⁶ More often innovation occurs in the curriculum because new materials become available, such as the PSSC and other curricula materials mentioned above.

The point is, innovation which deals with the teaching-learning process usually comes from those outside the foci of teaching, either administrators (on a practical level) or researchers (on a theoretical level). Occasionally, innovations are met by persons with an open mind who critically examine the innovation for what it offers, whereupon it may become a part of the system because it meets certain needs or does the best job in solving a certain problem.

Diffusion and the Open-Minded Person

A basic assumption held in this study is that open-minded persons are essential if technology is to be used in education. It is felt that the media change agent will want to identify those kinds of people who are most apt to examine and utilize various forms of technology in such a

³⁶ This "acceptance" might be best described as a form of professional myopia. An example of this can be seen when a department "suddenly" faces a problem of too many students to be taught with the available staff. This particular problem is usually "solved" by administrative manipulation which involves large group instruction, closed-circuit television, or both.

way that myth, habit and suspicion play a minimal role. In the following pages evidence will be cited which indicates that open-minded persons are less resistant to change and that such persons are less subject to internal and external pressures which work to maintain the status quo. The case will be developed for having open-minded persons as innovators and early adopters in order that technology might be maximally effective in creating school systems capable of moving with other segments of our society.

The Open-Minded Person

Because the tools of technology frequently require a person to change his modus operandi and subsequently his relationships with people, the quality of personality and belief systems becomes of paramount importance. As Jaques points out:

We already know how difficult this relationship becomes [between the change agent and the one to be changed] even in the domain of the physical sciences and engineering; how much farmers, for example, often resent the intrusion of the government agricultural expert with his new and supposedly superior methods. How much more difficult does the problem of establishing a satisfactory relationship become, however, where not crops but the changing of human behaviour itself becomes the target of scientific endeavour. The very core of personality is touched and

the deepest resistances are mobilized against the intruder.³⁷

Jaques goes on to suggest that a key to successful change involves doing things with people as opposed to doing things to people.³⁸ What he does not elaborate on is the "core of personality" which is involved in this change process.

Rogers, the student of diffusion mentioned previously, does feel that personality plays an important role in innovativeness: "I feel personality variables can, in part, explain innovativeness, especially in settings where compliance decisions are not forced upon the individual by the social structure."³⁹ He states further that the "personality of school staff as related to innovativeness" is one of four important areas for future educational diffusion research.⁴⁰

³⁷ Elliott Jaques, "Social Therapy: Technocracy or Collaboration?", in *The Planning of Change*, Bennis, Benne and Chin, editors (New York: Holt, Rinehart, and Winston, 1962), p. 163.

³⁸ Ibid., pp. 162-168.

³⁹ Everett M. Rogers, "Innovations: Research Design and Field Studies" (Paper presented at the Conference on Novel Strategies and Tactics for Field Studies Involving New Educational Media, The Ohio State University, Columbus, Ohio, May 10-12, 1965), p. 10.

⁴⁰ Ibid., p. 18.

"Personality" has been described by many people in many ways. Homans says that personality includes "at least the following factors: (a) a person's inherited biological tendencies, (b) the psychological tendencies induced by the social training given him in early life, and (c) the pressures brought to bear on him by his immediate social situation outside the group in question . . ."⁴¹

Trow uses the term personality "to refer to the generalized aspects of the characteristic response-patterns of an individual, whether native or acquired, and however they may be socially or morally evaluated."⁴²

Getzels and Thelen, in discussing the social system of a group, define personality as "the dynamic organization within the individual of those need-dispositions that govern his unique reactions to the environment and . . . to the expectations in the environment."⁴³

The "organizations" that Getzels and Thelen discuss have been examined by Rokeach in terms of belief systems:

⁴¹George C. Homans, The Human Group, New York: Harcourt, Brace and Company, 1950, p. 138.

⁴²William Clark Trow, "Role Functions of the Teacher in the Instructional Group," in The Dynamics of Instructional Groups, N. B. Henry, editor (Chicago: The University of Chicago Press, 1960), p. 31.

⁴³Jacob W. Getzels and Herbart A. Thelen, "The Classroom Group as a Unique Social System," in The Dynamics of Instructional Groups, N. B. Henry, editor (Chicago: The University of Chicago Press, 1960), p. 68.



During the course of our investigation we have come more and more to view a given personality as an organization of beliefs or expectancies having a definable and measurable structure. We have also come to conceive of ideology, insofar as it is represented within the psychological structure of the person, in exactly the same way, namely, as an organization of beliefs and expectancies. And, finally, we have come to conceive of man's cognitive activities -- thinking, remembering, and perceiving -- as processes and changes that take place within a person who has already formed a system of beliefs, which we can describe and measure. 44

The system that Rokeach describes has particular relevance for diffusion studies in that it is possible to describe both individuals as well as groups in Rokeach's terms. As Halpin and Croft state: "Even as one can regard minds as open or closed, so can we view Organizational Climates as Open or Closed."⁴⁵

An understanding of the terms "open" and "closed" as they refer to the belief systems of individuals starts with the basic premise that "it is not so much what you believe that counts, but how you believe."⁴⁶ Subsequently, Rokeach suggests that "a basic characteristic that defines the extent to which a person's system is open or closed [is]

⁴⁴Rokeach, op. cit., p. 7.

⁴⁵Andrew W. Halpin and Don B. Croft, The Organizational Climate of Schools, Cooperative Research Project No. 543, U. S. Office of Education, 1962, p. 78.

⁴⁶Rokeach, op. cit., p. 6.



namely, the extent to which the person can receive, evaluate, and act on relevant information received from the outside on its own intrinsic merits, unencumbered by irrelevant factors in the situation arising from within the person or from the outside."⁴⁷

It is Rokeach's contention that the belief-disbelief system theory, as it relates to belief structure and content, is a general personality theory operationalized to some extent by his "dogmatism scale." The scale purports to measure the nature of the belief structure (how one believes) held by an individual.

The concept of "dogmatism" is also related to how the various beliefs are interrelated within the system of all beliefs held by the individual. Theoretically, the high dogmatic (closed-minded) person has a relatively undifferentiated belief-disbelief system. Therefore, one has an inability to separate one belief system or subsystem from the others. To some extent this characteristic of the high dogmatic (closed-minded person) makes it difficult for him to assimilate new information, particularly if the new information challenges a presently held central belief.

Conversely, the low dogmatic (open-minded individual has a highly differentiated (separated) belief-disbelief

⁴⁷ Ibid., p. 57.

system, and is more likely to allow various parts of the total belief system to interact even if it creates a high level of dissonance or conflict within his cognitive structure. Subsequently, he is more open to new information and can assimilate it into his beliefs more easily.

Rokeach proposes that the beliefs held by man have a pattern or structure which is to some extent predictable. This lacework of beliefs is represented by a system ranging on a continuum from a central or highly important position to a peripheral or relatively unimportant position. The central beliefs are "all the beliefs a person has acquired about the nature of the physical world he lives in, the nature of the "self" and of the "generalized other"."⁴⁸ The peripheral region "represents the beliefs derived from authority, such beliefs filling in the details of the world map."⁴⁹

Rokeach suggests that certain intermediate beliefs (those between the central and peripheral) will probably rest upon the person accepting authority as a source of information. The way a person views authority, on whom he depends to help him form a picture of the

⁴⁸Ibid., p. 40.

⁴⁹Ibid.



world he lives in, is also a part of his belief structure. Rokeach feels that the more closed-minded person will tend to be over-dependent on authority figures and will fail to separate what the authority says from the authority figure as an individual.

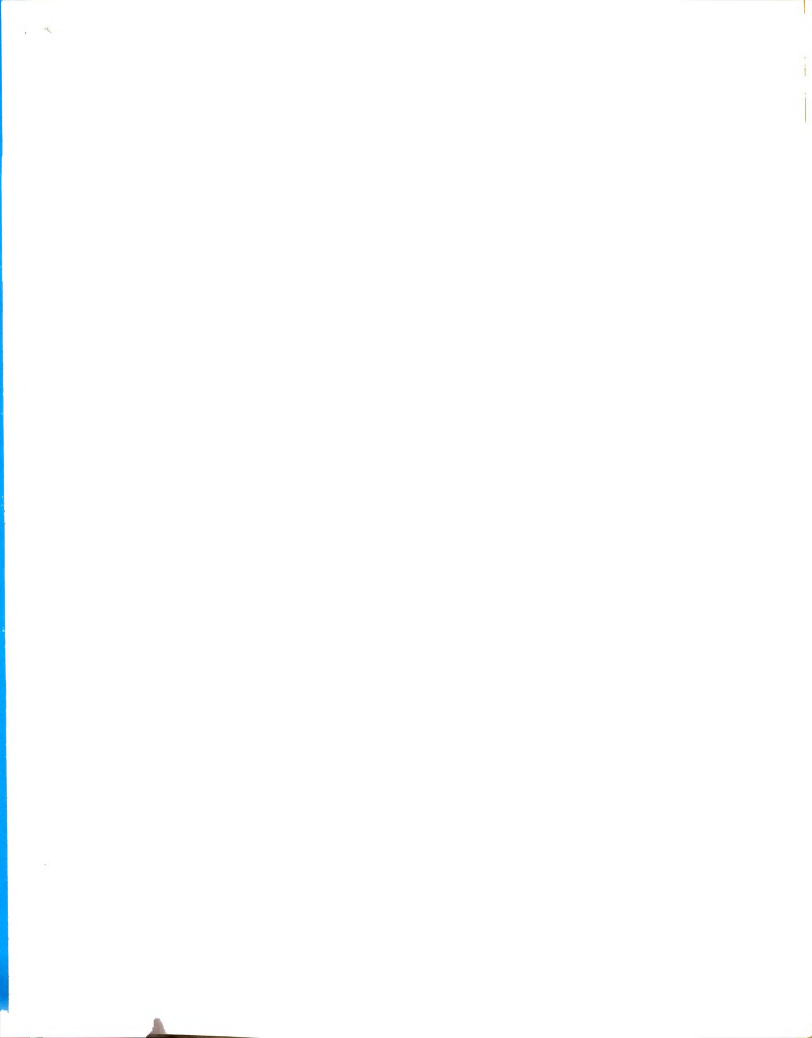
In testing the hypothesis that relatively high dogmatic (closed-minded) individuals are unable to separate what (the message) is said, and who (the source) is saying it, Powell conducted a study which demonstrated that "closed-minded individuals are less able to distinguish and evaluate independently the source of a message and the content of a message than are open-minded individuals."⁵⁰

Tedrick, in discussing the findings of Powell, states: "The findings may indicate that some 'adopters' could be operating out of blind faith to some authority figure whom they fully trust as having the right answer."⁵¹

Some implications of the above are obvious. If early adoption of a given innovation is carried out

⁵⁰ Fredrick Powell, "Open- and Closed-Mindedness and the Ability to Differentiate Source and Message," Journal of Abnormal and Social Psychology, Vol. 65 (1962), p. 63.

⁵¹ William Tedrick, "Personality and Innovativeness," unpublished manuscript written for Communications 470, Michigan State University, East Lansing, Michigan, no date.



by the closed-minded, as a result of depending on some authority figure, then critical adaptation or the necessary refinements of an innovation may not be carried out so that this innovation becomes maximally effective. This might explain in part the "discontinuance"⁵² of some innovations for otherwise illogical reasons. Miller, for example, in looking at certain innovations which had taken place at a large university, found that in one department the use of programed instruction lost its impetus even though "there appears little doubt that the approach used [programed instruction] is effective in reaching objectives defined by the department."⁵³ While no firm conclusions could be reached in this case it is noted in the report that "one of the realities of the situation that must be recognized is that leadership of the programing experiment, and of the department, rested primarily in a single individual under the former chairmanship," and that this leadership changed during the course of the experiment.⁵⁴

⁵²See pp. 89-93, Rogers, Diffusion of Innovation, op. cit., for a discussion of this phenomenon.

⁵³Miller, op. cit., p. 123.

⁵⁴Ibid., p. 131.



The effect of authority upon innovativeness was explored by Jamias and Troidahl who looked at open- and closed-mindedness in relation to a "value for innovativeness." It was hypothesized that in a situation where the milieu was such that innovativeness was an accepted value, closed-minded persons would innovate at the same rate as open-minded persons. The results of their study show:

The relationship between dogmatism and a person's general innovativeness seems to hold only in social systems having a low "value for innovativeness". In social systems having a high value for innovativeness, low and high dogmatics were about equally innovative.⁵⁵

No effort was made in this study to determine if the quality of the innovation was different between the open- and the closed-minded individual. This factor of quality has received little attention in the diffusion literature although some researchers are aware of the problem. As Jamias and Troidahl point out:

No finding suggested what could be done in speeding up change among relatively open-minded individuals [in a social setting where there exists a high "value for innovativeness"]. At most, the postulate of the belief systems theory that they tend to act rationally on the merits of the object of judgment could be assumed.

⁵⁵ Juan F. Jamias and Verling C. Troidahl, Dogmatism, Tradition, and General Innovativeness, unpublished manuscript, Michigan State University, no date, p. 16.



From an educational philosophy viewpoint, changes effected through this process would be more desirable than the changes occurring with regard to closed-minded individuals. It would preclude overadoption which could well occur among closed-minded persons. (underlining added) 56

The "desirability" of the educational changes that occur are, of course, subject to analysis based on satisfying both stated and unstated needs of those involved in the system, and in meeting the objectives set forth in the system.

The problem is stated in a more precise way by Jones and Fairman when they attempt to identify skill and knowledge requirements as a factor in systems design: "Development of the Personnel Subsystem requires that task analysis information include detailed description of the human performance requirements . . . this means that the stimulus end of the task should be examined as carefully as the response end, and that the processes that the job incumbent must perform between stimulus and response should also be considered in identification of skill and knowledge requirements."⁵⁷

Some research evidence points to the fact that

⁵⁶ Ibid., p. 14.

⁵⁷ John D. Folley, Jr., Human Factors Methods for System Design, The American Institute for Research under Office of Naval Research Contract No. NONR-2700(00), 1960, p. 53.



belief systems do affect problem-solving ability.

Rokeach states the theory to be tested when he suggests:

The more closed a person's everyday system, the more difficulty he should encounter in solving problems within a new system. Or, to put it the other way around, the more difficulty a person has in switching over to a new system, the more closed must be the organization of his present system. 58

Rokeach researched his theory with the Joe Doodlebug problem.⁵⁹ Essentially the Doodlebug problem consists of a miniature cosmology which involves beliefs not employed in the everyday world. Joe Doodlebug can and cannot do a number of things, for example: Joe may jump in only four different directions: north, south, east, and west -- he cannot jump diagonally. Once Joe starts in any direction, he must jump four times in that direction before he can switch directions. He cannot crawl, fly, or walk -- only jump; he can jump very large distances or very small distances; he cannot turn around.

The subjects are told that Joe gets to some food but they are not told how he arrives there. They must determine what the conditions were that allowed Joe to reach his food. In the course of arriving at the correct

⁵⁸Rokeach, op. cit., p. 172.

⁵⁹See pp. 171-181 for a complete description of the Doodlebug Problem, Rokeach, op. cit.



decision they must first overcome three beliefs generally held in everyday life: (1) The facing belief -- Joe does not have to face the food in order to eat it; (2) The direction belief -- Joe is trapped facing north, but he can change direction by jumping sideways and backwards; and (3) The movement belief -- since Joe has to jump a specified number of times in one direction before he can change direction, subjects have to realize that Joe may have stopped in the middle of a sequence of jumps.

After overcoming these beliefs the subjects then integrate these new beliefs into a new belief system. The time needed to overcome previously held beliefs, as well as the time needed to synthesize these beliefs into a solution of the problem shows that "subjects with relatively closed systems, as measured by the Dogmatism Scale, take longer to solve the Doodlebug Problem than do subjects with relatively open systems."⁶⁰ Continued study of the relationship between belief systems held by individuals and their ability to solve problems suggests that there is a strong correlation.

Of further importance, however, is whether this same problem-solving ability is seen in groups of people

⁶⁰Rokeach, op. cit., p. 213.



as they work together. Conway studied several aspects of problem-solving as related to "the effects on decision-making in a group when the belief systems of group members were similar . . ."⁶¹ Three of these aspects were (1) interaction within the group, (2) amount of time to solve a problem, and (3) the degree to which synthesis took place in overcoming certain beliefs within the problem. Conway found:

1. PreO [open-minded] groups interacted for a significantly greater proportion of time during the problem-solving period than did the PreC [closed-minded] groups.
2. The PreO groups took significantly less time to solve the first . . . problem than did the PreC groups.
3. It was found in the synthesis phase of problem solving that the PreO groups took significantly less time to solve problem one after overcoming one, two, and all three beliefs than did the PreC groups.⁶²

⁶¹James A. Conway, Problem Solving in Small Groups as a Function of "Open-Minded" and "Closed-Minded" Behavior: Some Implications for Development of Administrative Theory, unpublished doctoral dissertation, State University of New York, Albany, 1963, p. 136.

⁶²See Conway, pp. 139-141, for a complete analysis of results.

It was pointed out by Conway that, based on the results of the study, group problem-solving is, in some respects, a function of the personalities that compose the group. Evidence by Conway suggests that interaction, while an important variable for the problem-solving group, was not a sufficient condition for determining the answer to a problem. Interaction leading to creative solutions was only found in groups of open-minded people, and these people took significantly less time in arriving at those conclusions, even though facing a problem where they had to overcome established beliefs.

The possibility of being able to predict the efficiency of group activity is quite important. When teachers are confronted with problems that require new systems of operation, and therefore a modification of their belief system, the initial interaction of a group could well spell success or failure for a new teaching-learning system.

Faculty Attitude Towards Educational Media

Two broad classes of research in the educational media field have been identified by Hovland, Lumsdaine, and Sheffield.⁶³ The first class is called "evaluative"

⁶³C. I. Hovland, A. A. Lumsdaine, and F. D. Sheffield, Experiments on Mass Communication, Princeton, New Jersey: Princeton University Press, 1949.



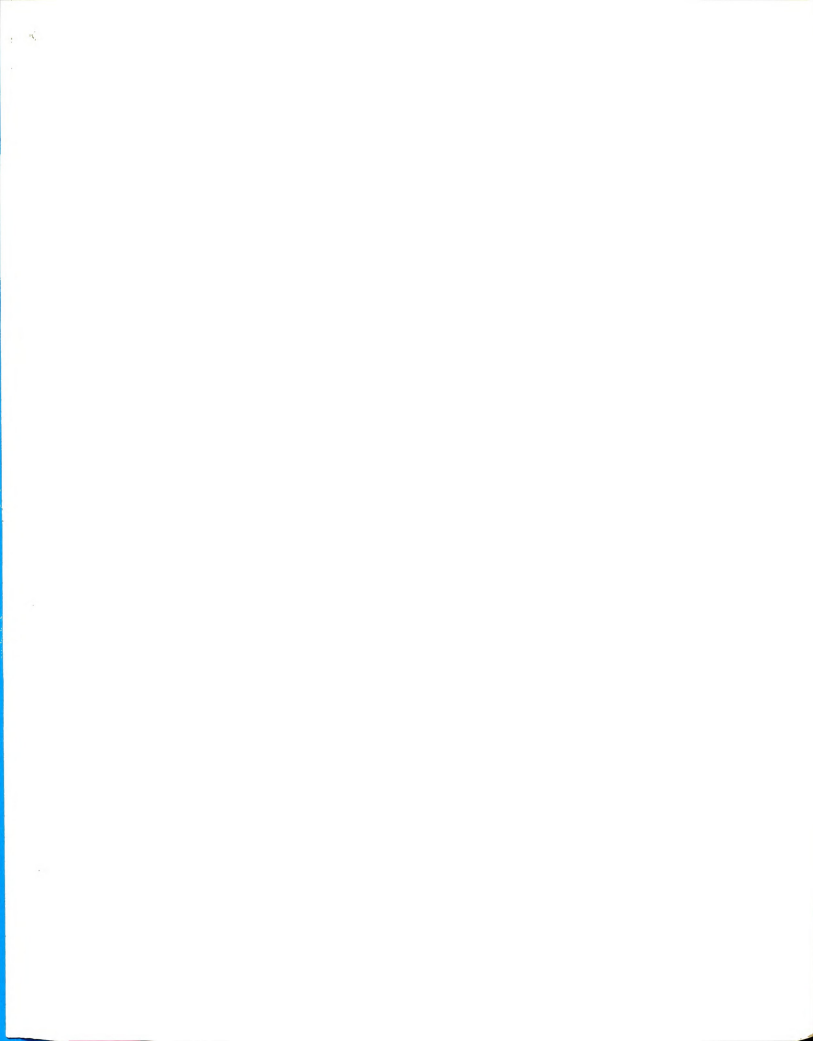
and merely assesses the effects of a particular existing instrument, or compares its effects with those of traditional instructional techniques. Research in this category tends to apply only to a particular instrument and thus has limited generalizability.

The second broad class of research is called "scientific" and involves controlled manipulation of specific factors. This kind of research seeks to test hypotheses for the sake of building a usable science of instructional effects; that is, it seeks to develop a tested body of propositions or theory.

Travers reaches a similar conclusion: "Two different approaches can be taken to the study of factors that influence the effectiveness of the transmission of information through audiovisual devices."⁶⁴ The first approach described by Travers involves a study of particular audiovisual instructional materials; the second approach "is that of studying problems related to the transmission of information through the auditory and the visual channels but with very simple materials, that is to say, with materials which are much less complex than those which have been developed for instructional purposes."⁶⁵

⁶⁴Travers, op. cit., p. 2.01.

⁶⁵Ibid., p. 2.01.



This dichotomy is also seen when looking at studies of faculty attitude toward the use of media. Either faculty attitudes are dealt with on an intuitive level by change agents, or else other factors (such as the press of student influx) override the opportunity to involve faculty at any depth.

Probably the best attitudinal documentation has been in the CCTV arena. McKeachie finds, for example, ". . . one of the most interesting outcomes of the studies of student attitudes toward television instruction is that they tend to reflect those [attitudes] of the proctors in the viewing rooms."⁶⁶ Evans also finds that ". . . instructors assigned for discussion sections consciously or unconsciously convey their own hostility toward ITV as a teaching medium."⁶⁷

In an effort to modify or change faculty attitudes toward instructional television (ITV), Evans identified from a large group of faculty at a Midwestern university some 55 faculty members who were the most favorable to

⁶⁶W. J. McKeachie, "Procedures and Techniques of Teaching: A Survey of Experimental Studies," in The American College, N. Sanford, editor (New York: John Wiley and Sons, 1962), p. 351.

⁶⁷Richard I. Evans, The University Faculty and Educational Television: Hostility, Resistance, and Change, Title VII Report, Grant No. 741015, 1962, University of Houston, p. 13.



ITV, and some 65 faculty members who were the most hostile to ITV. Using Festinger's theories of cognitive dissonance⁶⁸, Evans studied the attitude shift of those faculty who were most hostile, when they were "selected to participate in an ostensibly intensive improvement of teaching program which included an evaluation of the video tape recorder for self-improvement of teaching based on actually taping individual course presentations with the assistance of the university's television production staff."⁶⁹ This group of hostile faculty provided the nucleus for the observation of potential attitude change in an "ego-involving," "forced compliance" situation, as suggested by Festinger's theory of cognitive dissonance:

An analysis of responses to the pre- and post-experiment interviews, the Osgood instrument, the TV production coordinator's report . . . , and personal reports prepared by the subjects, revealed dramatic modifications of their attitudes toward ITV in a generally more favorable direction. One of the two departments, in fact, elected to change their previous decision and present a telecourse, while the other began to use taped efforts as a standard portion of regular courses. 70

⁶⁸Festinger and Carlsmith, "Cognitive Consequences of Forced Compliance," Journal of Abnormal and Social Psychology, 58 (1959), pp. 203-210.

⁶⁹Evans, op. cit., p. 100.

⁷⁰Ibid.

Another researcher, concerned with the problem of in-service development of teachers in the media field, studied the relation of prior attitude and teachers' acceptance of media. Ramsey states the problem in these terms:

When these new [instructional] ways involve utilization of the newer educational media, reluctance may be caused by many factors; i.e., fear of an unknown procedure, threat to established ways of teaching, uncertainty about the uses of strange machinery and materials, doubts about the supposed advantages of the newer media, or incompatibility with the teacher's philosophy of education. Since these forms of reluctance or resistance may be very subtle, supervisory personnel have few techniques for assessing the degree and amount of unfavorable or sympathetic attitudes toward curriculum change in general, or toward the utilization of new educational media for instructional purposes in particular. ⁷¹

In an effort to determine the exact nature of resistance to the use of educational media by teachers in the instructional program, Ramsey examined two categories of personnel. The first of these were: "Those persons who by self-designation indicated themselves to be workers in the audiovisual field, and who had affiliated with a national professional association for the advancement of audiovisual concepts in education."⁷²

⁷¹Ramsey, op. cit., p. 1.

⁷²Ibid., p. 2.



The second group, which acted as a comparison group, consisted of: "Those persons primarily in the teaching profession as full-time teachers, principals, supervisors, and other curriculum workers who had identified themselves professionally with an association devoted to supervision and curriculum development problems."⁷³

Ramsey assumed that while those identified as curriculum workers would not necessarily be opposed to the use of media in instruction, there would be significantly different mean scores on a measurement of attitude toward the uses of media than for that group which was identified as having professional affiliation with an audiovisual organization.

Ramsey, using an item analysis procedure, developed an instrument to measure attitudes toward the use of media as a part of his research design for testing differential attitudes among the groups:

The research design utilized a simple randomized analysis of variance along three dimensions: (1) among categories within the audiovisual organization; (2) among categories within the curriculum organization; and (3) between the audiovisual groups and the curriculum groups on each item. ⁷⁴

⁷³Ibid., p. 3.

⁷⁴Ibid., p. 10.

The mean square ratio between the groups mentioned has an F distribution. Subsequently an F ratio was developed for the groups within each occupational category and also between the two broad organizational categories. Tests of significance (at the F._{.99} level) were made, and it was determined whether an individual item had significant variance along any one of the three dimensions mentioned above.

From his research, Ramsey identified test items which could distinguish AV groups, one from the other; which could distinguish curriculum groups, one from the other; and which could distinguish AV groups from curriculum groups.

The main finding for Ramsey was that those involved in curriculum had significantly different mean scores on his instrument for measuring attitudes toward the uses of newer educational media than did audiovisual workers. The important finding of the study related to the present research was that: "The research provided an instrument useful in discriminating between individuals possessing attitudes hostile to or in sympathy with the uses of newer educational media for instructional purposes."⁷⁵

⁷⁵Ibid., p. 12.

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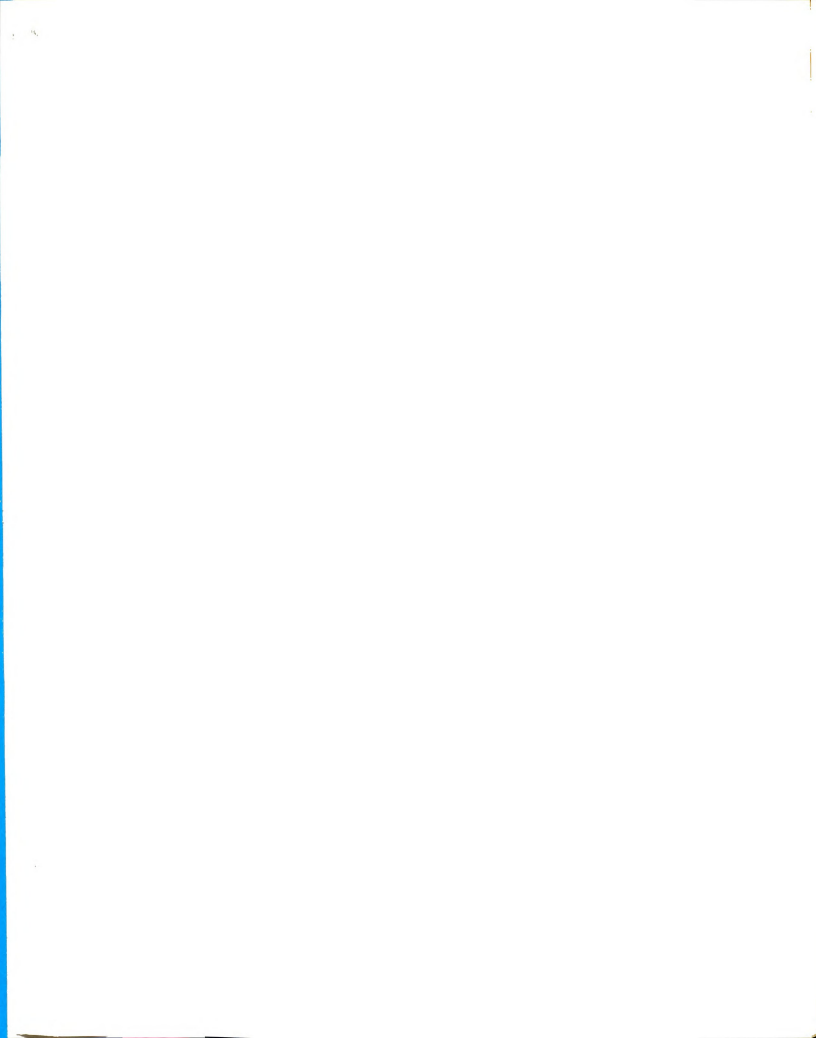
Subsequently, the work by Ramsey was used by two researchers who were interested in examining the attitudes of teachers towards one specific medium, that of instructional television.

Guba and Snyder, in studying the attitudes of teachers toward the use of television, conceptualized that teacher attitudes might fall into two possible categories: "specific attitudes toward instructional television, and more generalized attitudes toward the new media generally, e.g., teaching machines, films, slides, tapes, etc."⁷⁶ The New Educational Media Acceptance Inventory (NEMA) was developed from Ramsey's work by Guba and Snyder to measure the latter attitude.

The results of the Guba and Snyder study raise some interesting questions. The data collected with the NEMA show that users of instructional TV have a "substantially and significantly more favorable attitude toward the newer educational media than does the non-using group."⁷⁷ This must be viewed in light of the fact that teachers frequently had little, if any say, about the use of television in their classrooms.

⁷⁶Guba and Snyder, op. cit., p. 59.

⁷⁷Ibid., p. 62.



While no attempt at causality is made by Guba and Snyder, they do suggest that ". . . we can be more inclined to the idea that the use of ITV does produce more favorable attitudes as the subjects [teachers] begin through experience to understand the potential and utility of the new media."⁷⁸

SUMMARY

Technologists in the field of education point to mounting evidence which suggests that education is rapidly becoming more like other segments of our society; that technology is asserting a force both from within and from without education; and:

. . . American education, considered as a culture in transition, is now beginning the take-off stage into a high-order, high-energy culture, and that it is the first educational system in the world to reach this stage. ⁷⁹

Technology is defined in the cultural milieu as being a focus whereby problems are critically defined within the framework of scientific control, and where solutions to the problems assume the availability of tools across discipline lines. These tools include systems analysis,

⁷⁸Ibid., p. 62.

⁷⁹Finn, op. cit., p. 6.



and the necessary man-machine-materials complexes which are designed for meeting the defined objectives drawn from this analysis.

It is suggested that the force of technological impact can be seen in the concept of change: "A planning approach to social change, we have argued, has become a necessity . . ." ⁸⁰ Educators are beginning to sense that traditional change processes are being circumvented by forces outside the discipline. Considerable energy is being inserted into the traditional educational process with the result that old patterns of innovation diffusion are becoming less valid.

The diffusion of scientifically designed curricula (a fairly new phenomenon) is accelerating at an exponential rate with the main impetus for the curriculum design coming from those who are professionally engaged in the area. The difference between the two cultures -- academic and professional -- grows greater as scientists are able to state in behavioral terms the preparation needed for their disciplines, and are able to obtain funds for developing curricula which will achieve this preparation.

⁸⁰ Bennis, Benne, and Chin, op. cit., p. 18.

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Those who work with the use of media in the educational process must identify teachers who are most receptive to the use of new educational tools, and who can change their presently held belief systems. Research evidence suggests that the open-minded person is more apt to embrace new ideas, will more profitably interact with others towards the creative solution of problems, and is more apt to come up with creative solutions to problems in a shorter time.

The attitude of faculty toward the use of media is seen as crucial if media are to be used well. The attitude a faculty member holds is reflected by the students working with him.

The following chapters of this study will suggest that the facets of personality described above can be seen in relation to actual classroom practice. Hypotheses will be tested for evidence that faculty who are open-minded, and faculty who hold a favorable attitude towards the use of media, act differently in the teaching process than those faculty who are closed-minded and who do not view media with a favorable attitude.

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Chapter III

PROCEDURES

This study is concerned with the problem of developing predictive measures with which a media specialist can evaluate the potential for the acceptance by faculty of innovations in the teaching-learning process. As previous sections have indicated, faculty who have used educational media can be expected to differ in measurable ways. This study selected a particular type of educational media, graphics, and compared faculty who used this component of instruction with a similar group of faculty who did not.¹

The two groups were then administered two instruments to determine whether these instruments could differentiate, on the basis of scores, faculty who were active users of graphic materials.

Graphics served as a useful variable in this study of educational technology for two reasons. First, the

¹In interviewing "non-users", it was found that few faculty admitted to no use of graphic services. The decision was made to consider faculty non-users if they had used graphic services nine or fewer times in the past year.

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availability of data from the Audiovisual Center (now named Instructional Media Center) made possible lists of faculty who had engaged the services of media technologists in order to obtain teaching materials. Second, and more important, faculty who use graphics usually are involved in the design of the specific materials to be used for teaching. More thought and time needs to be expended for the use of graphics than for most media which are available to the average teacher.

Graphics, as defined for the faculty in this study, consist of such media as slides, charts, flannel boards, posters, and overhead transparencies. Although it is possible to include the chalkboard in the area of graphics, the chalkboard was deliberately excluded from the list of graphics tools in the questionnaire since its use seldom involves the services of media technologists.

Plan of the Study

This study makes use of two groups. One group, users of graphics services, was selected from the total population of faculty who were billed for graphics services during the fiscal year, 1963-64, in the Audiovisual Center at Michigan State University. Because this study is concerned with the use of graphics in the

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instructional process, users are further defined as faculty members who have been responsible for teaching at least nine credit hours during the 1963-64 academic year. Users were identified as to department, rank, age, highest degree held, length of service at Michigan State University, and whether more than half of their teaching has been at the graduate or undergraduate level.

Non-users of graphics services, the second group, consist of faculty members matched with the user group on the variables mentioned above but who had used graphics in their teaching nine or fewer times during the 1964-65 academic year. Finally, the frequency of use of graphics was determined by a questionnaire given to the faculty prior to their responding to the instruments discussed below.

Members of both groups were contacted by telephone. A short explanation of the study was given (see Appendix III) and an appointment arranged so that the instruments could be administered in person. After the appointment was confirmed, subjects were coded by number to reduce the chance that the researcher would introduce personal bias.

Both the Dogmatism Scale and the New Educational Media Attitude inventory were double scored by hand,

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and the final scores from these instruments, plus data from the information questionnaire, were punched into IBM cards for analysis by the CDC 3600 computer.

Selection of the Faculty Participants

The selection of faculty who participated in the study essentially involved four steps: (1) assumed users of graphics were identified from the billing records of the AV Center; (2) faculty members from this group were eliminated who had not taught at least nine credit hours; (3) matching criteria data were obtained for the user group; and (4) faculty not involved in step one were matched to faculty obtained from the first three steps.

The first step involved examining the records of all graphic orders placed in the graphics department of the Audiovisual Center for the academic year 1963-64. Since information was available on the billing forms as to the type of graphics services ordered, faculty could be omitted who ordered services not relevant to on-campus instruction. This included materials such as signs and posters for "Farmers Week", art work for publications, the mounting of athletic photos, materials prepared for the MSU Board of Trustees reports, and

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framing of pictures for office walls.

Graphics materials which were considered relevant to classroom instruction included such items as flannel boards, TV cards, special projection boxes (for use in programed instruction), diazo-produced handout sheets, 2" x 2" and 3¼" x 4" slides, and overhead transparencies. This selection served as a means of increasing the possibility that faculty contacted were indeed users.

The result of Step 1 was a list of faculty who had placed billable orders through the Audiovisual Center which involved materials judged to be for use in on-campus classroom instruction. The N for this group was 124.

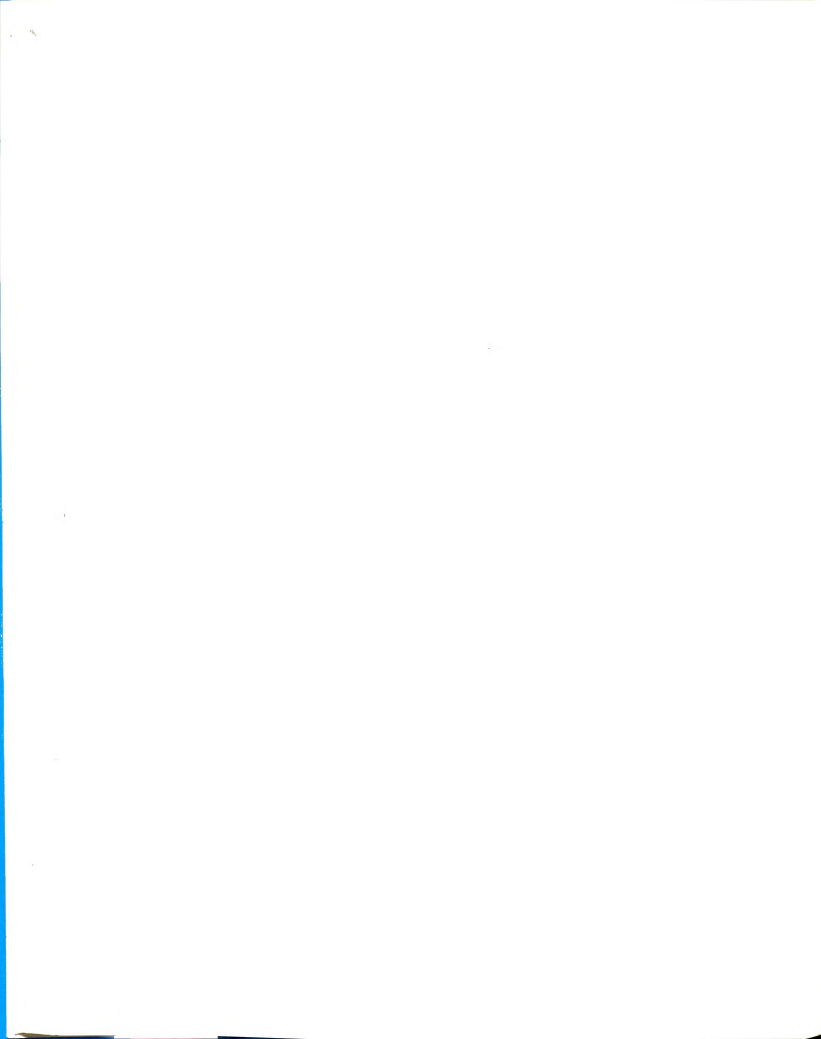
In Step 2, the list of faculty obtained above was examined in light of their teaching load for the 1963-64 academic year. This information was obtained from the MSU Office of Institutional Research. Faculty members not carrying at least nine credit hours of instruction were dropped from the list.

The third step involved obtaining criterion data for matching purposes. The criteria were department affiliation, age, length of service at Michigan State University, present rank, and highest degree held. This information was obtained from the Office of

University Services. This data, in the form of IBM cards, was for all faculty members employed by the University for the 1964-65 academic year. Faculty no longer with the University were dropped from the list. The N then became 78.

The fourth step involved matching faculty based on the criteria stated above. The first matching criterion was department affiliation. Next in importance were length of service at Michigan State University, present rank held, age, and highest degree earned.

Faculty were subsequently dropped from the list for the following reasons: (1) there was no one in the department who could be matched with a selected individual (a department consisting of a single individual or else all members in the department had used graphics); (2) members of the experimental or control population were not available due to travel or leave of absence; or (3) members of the control population had resigned from the staff and additional names were not available to replace them. Steps (1), (2), and (3) further reduced the N to 27 pairs. During the period of data collection the unavailability of faculty, inaccurate records of use of graphics, and a refusal to take one of the instruments reduced the N finally to 18 pairs.



In summary, data were collected from two groups of available faculty members. The first group represented all possible "users" of graphics based on predetermined criteria. The second group represented "non-users" of graphics, selected by matching each of the users with another in the same department on the basis of the matching criteria.

Instruments Used in the Study

Three instruments were used in this study: the Rokeach Dogmatism Scale, the New Educational Media Attitude inventory, and an information questionnaire. Only the Dogmatism Scale and the New Educational Media Attitude inventory were used in hypotheses testing. The information questionnaire was developed to provide data necessary for specifying the experimental and control groups.

The Rokeach Dogmatism Scale was used for measuring the extent of open or closed belief systems. The scale is constructed in such a way that a high score indicates a relatively dogmatic (closed-minded) personality, and a low score a relatively non-dogmatic (open-minded) personality.

The scoring procedure for the Dogmatism Scale was



developed by Rokeach.² Individuals responding to the scale indicate disagreement or agreement with each item on a scale ranging from -3 to +3. The neutral (0 point) response is omitted in order to force subjects to disagree or agree with the items. This scale is converted for scoring purposes to a 1 - 7 scale. The total score is the sum of scores obtained for all items on the test.

The particular form used in this study was developed from the Rokeach Form E, 40 item test. The modification of this test by Troidahl and Powell³ reduced the number of items from 40 to 20 to facilitate the use of the Dogmatism Scale in field studies.

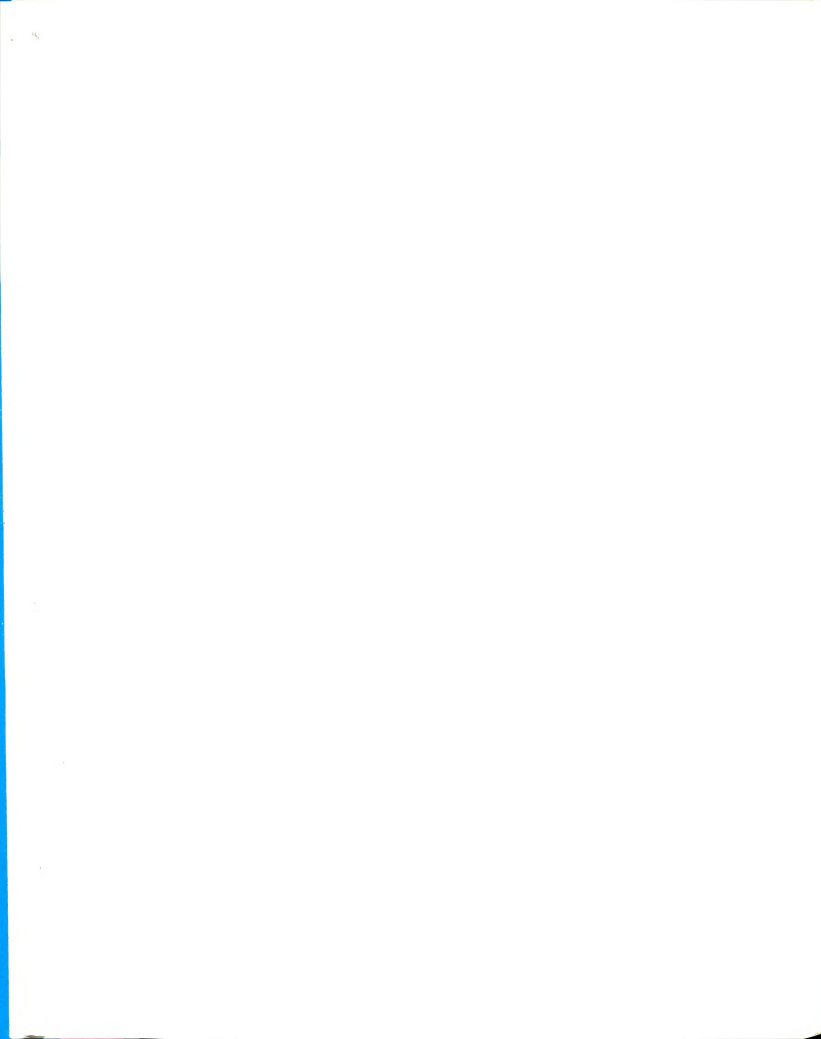
The 20-item scale was found to have a correlation of .95 with the 40-item scale and a correlation of .94 in a cross-validation study.⁴ In a study by Childs in which 755 teachers were administered the short form, a random sample with split-half reliability techniques produced a reliability coefficient of .66.⁵

²Milton Rokeach, The Open and Closed Mind, op. cit., pp. 87-89.

³Verling C. Troidahl and Fredric A. Powell, "A Short-Form Dogmatism Scale for Use in Field Studies." An unpublished paper written for the Communications Department, Michigan State University, East Lansing, Michigan, no date.

⁴Ibid., p. 6.

⁵John W. Childs, A Study of the Belief Systems of Administrators and Teachers in Innovative and Non-Innovative School Districts, Unpublished doctoral dissertation, Michigan State University, 1965.



The second instrument used in the study being reported is the New Educational Media Attitude inventory (see Appendix II). Although the original instrument was designed to test the hypothesis that "Curriculum and supervisory personnel, and audio-visual workers, have significantly different mean scores on a measurement of attitude toward the uses of newer educational media,"⁶ the outcome of the study was that "The research provided an instrument useful in discriminating between individuals possessing attitudes hostile to or in sympathy with the uses of newer educational media for instructional purposes."⁷

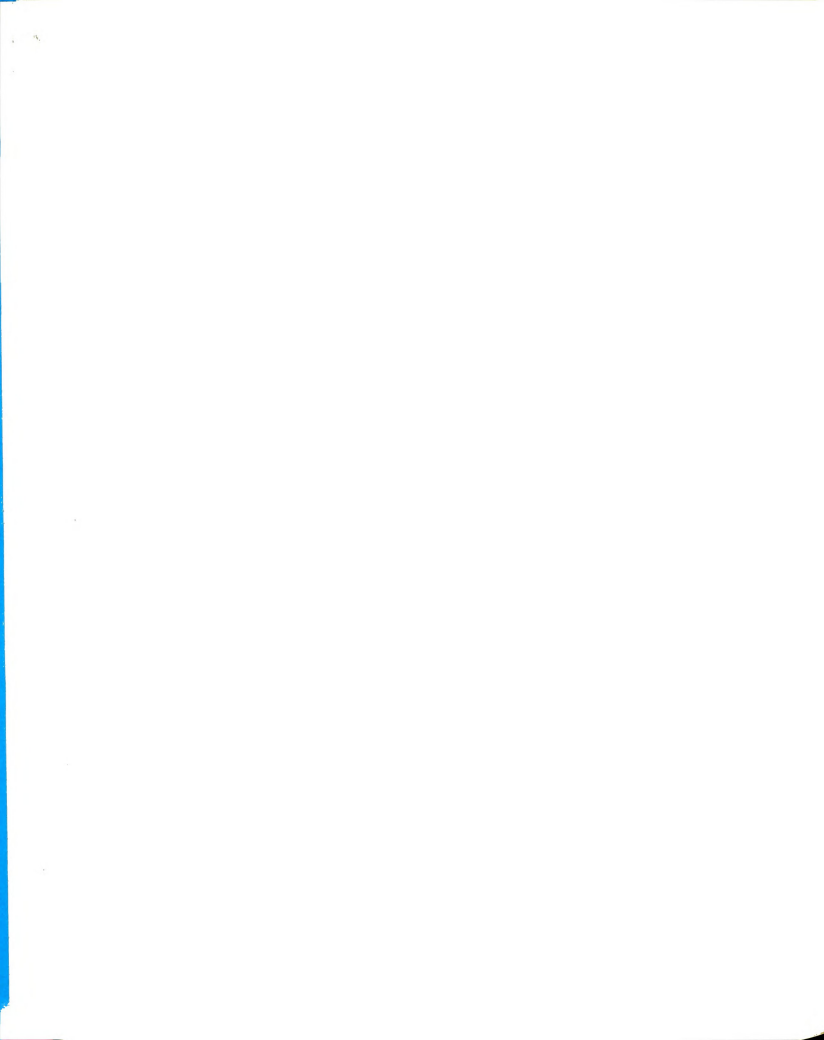
This instrument was subsequently used by Guba and Snyder in their Research and Evaluation on MPATI Telecasts.⁸ They conceptualized that the attitudes of the teachers under study would fall into two broad categories: ". . . specific attitudes toward instructional television, and more generalized attitudes toward the new media generally . . ."⁹ It was the more generalized attitudes toward media that were measured with the

⁶Ramsey, op. cit., p. 3.

⁷Ibid., p. 12.

⁸Guba and Snyder, op. cit.

⁹Ibid., p.59.



instrument developed by Ramsey. Guba and Snyder found, however, that:

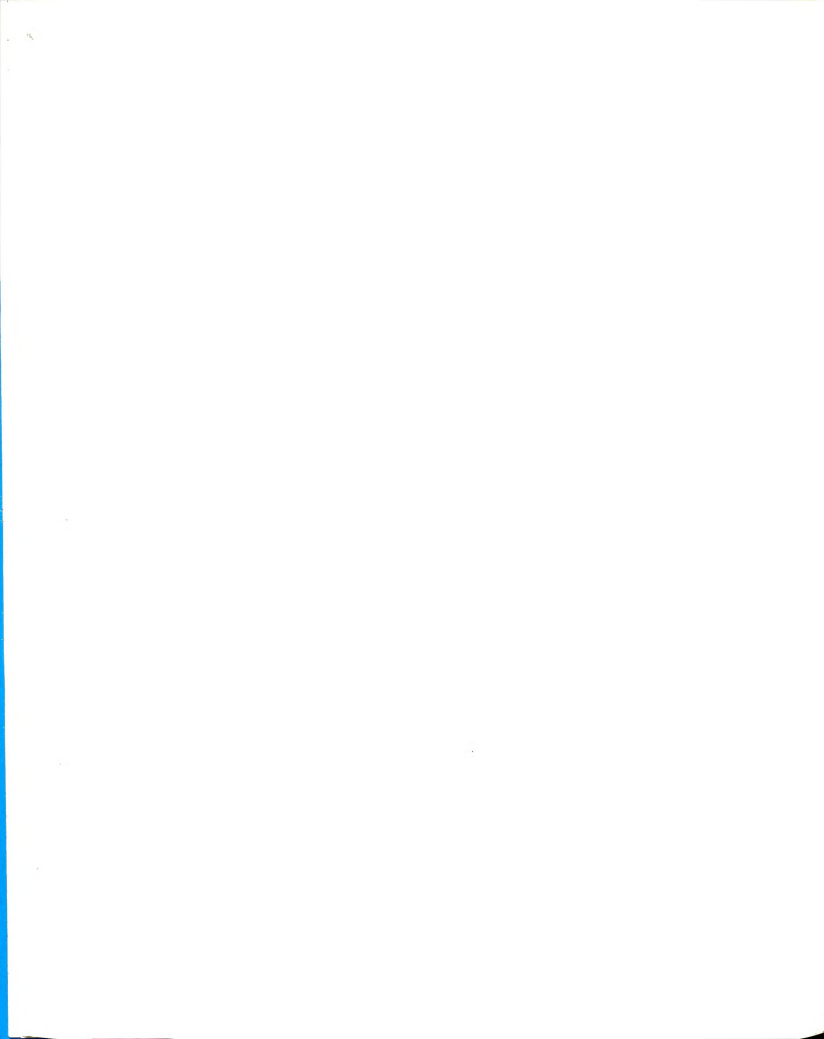
The original form of the instrument was judged unsuitable for direct use because its terminology seemed oriented toward the older audio-visual devices and because some of the item content was deemed unsuited to the audience at hand. Accordingly, the number of items was reduced, and those items which were retained were rewritten to give a wider and more current meaning to the items. 10

Guba and Snyder, in their study, used 23 items.

All items were used intact except that the word "students" was substituted for the word "children" in questions 7, 11 and 18 of their version of the instrument. The final form of this instrument is shown in Appendix II.

All scoring was done on a six-point Likert scale, ranging from a "1 - agree strongly" to "6 - disagree strongly." Items phrased negatively (to avoid response set) were reverse scored in arriving at a total attitude score. All such reverse-scored items are coded with the letter "R" in the appendix copy. High total scores for subjects indicate an unfavorable attitude toward educational media; low scores indicate a favorable attitude.

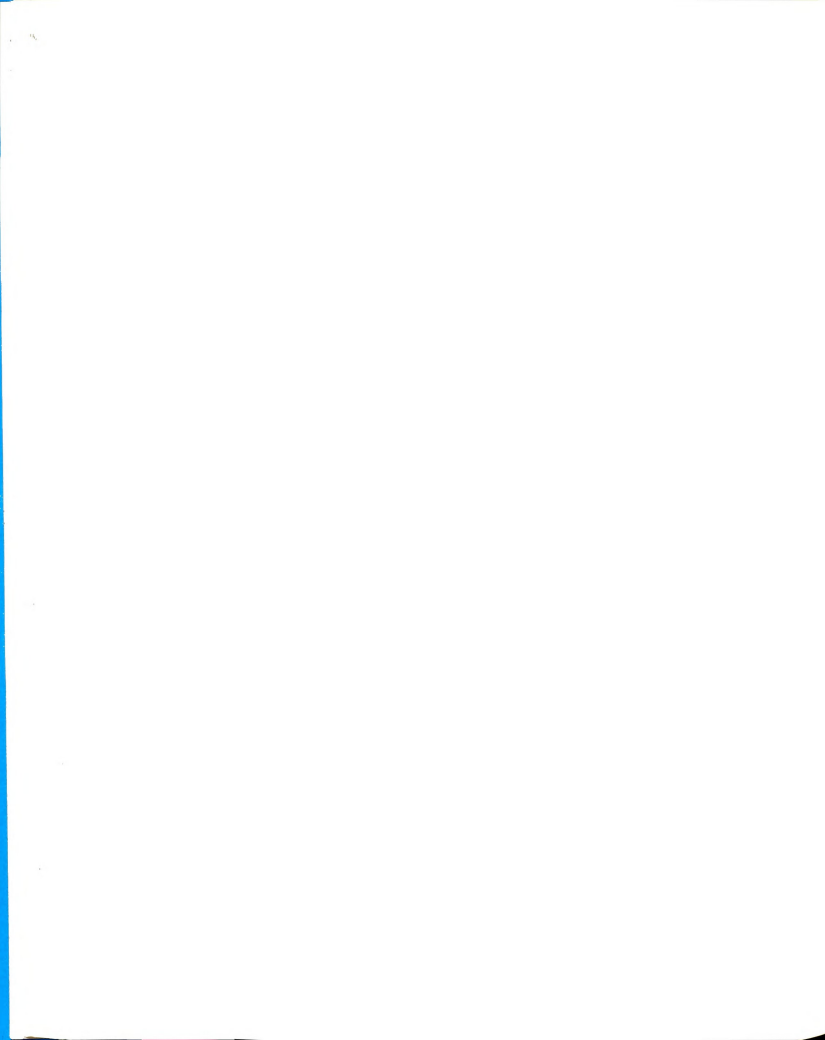
¹⁰Ibid., p. 59.



Finally, an information questionnaire was developed to obtain data about the groups being studied. The questionnaire was designed to answer the following questions:

1. Did the faculty member know about the graphics department?
2. Had he used graphics in teaching, and if so, how often?
3. What percent of the graphics used by him were prepared by the MSU graphics department?
4. Was the faculty member satisfied with the product obtained from the graphics department as to quality and cost?
5. Were sufficient monies available to the faculty member for this service?
6. Was the course taught most often by the faculty member a graduate or undergraduate course, and what was the average enrollment of this course?

Additional information was obtained on the questionnaire which was not directly related to the hypotheses

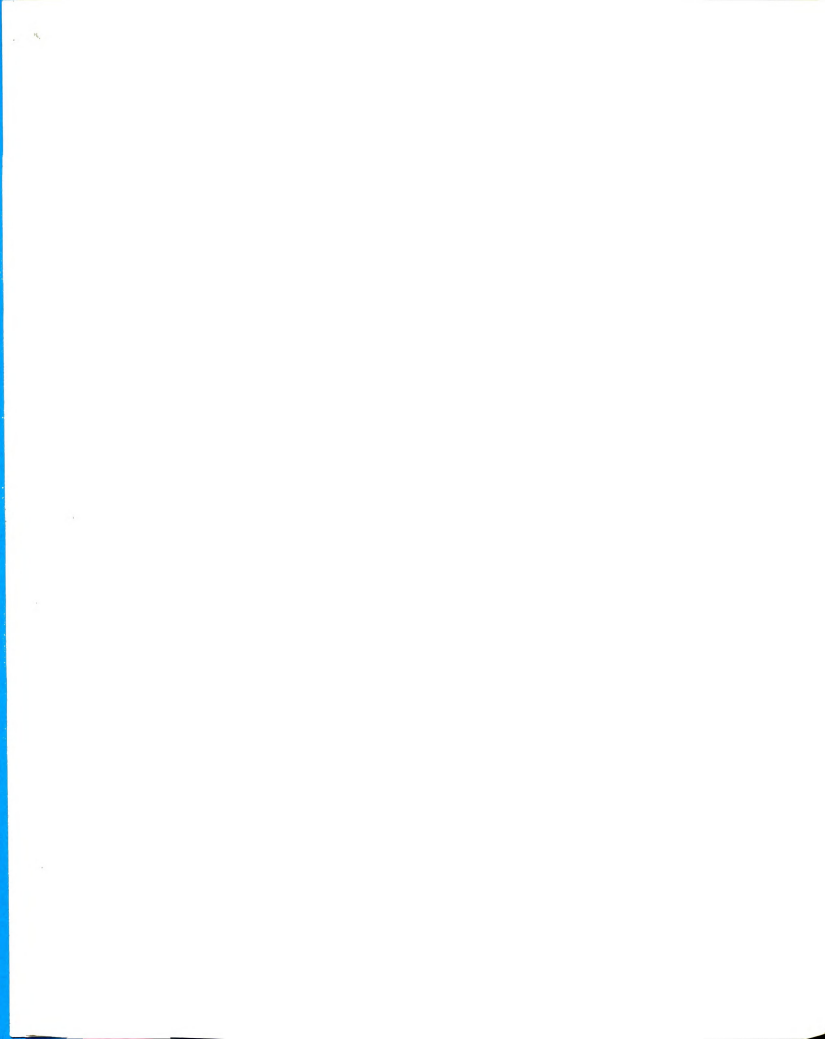


to be tested:

1. Could the faculty member have graphic-type materials prepared within his own department?
2. Is there a library of graphics materials available to the faculty member, and if not, would he like to have such a library in his department?
3. How many professional trips were taken by the faculty member within the last year? (This was asked to assess the "cosmopolitaness" of the faculty member.)

Statistical Analysis

In the test of the first hypothesis (generally stated, that "open-mindedness" is correlated with a favorable attitude toward educational media), the two samples were combined and responses on the Dogmatism Scale and the New Educational Media Attitude inventory were compared across all 36 subjects used in the study. The assumption was made that the combined samples were representative of the total population of faculty members from which the two samples were drawn. The nature



of this population will be discussed in Chapter V.

The correlation statistic used to test the first hypothesis was the Pearson Product-Moment Correlation Coefficient.

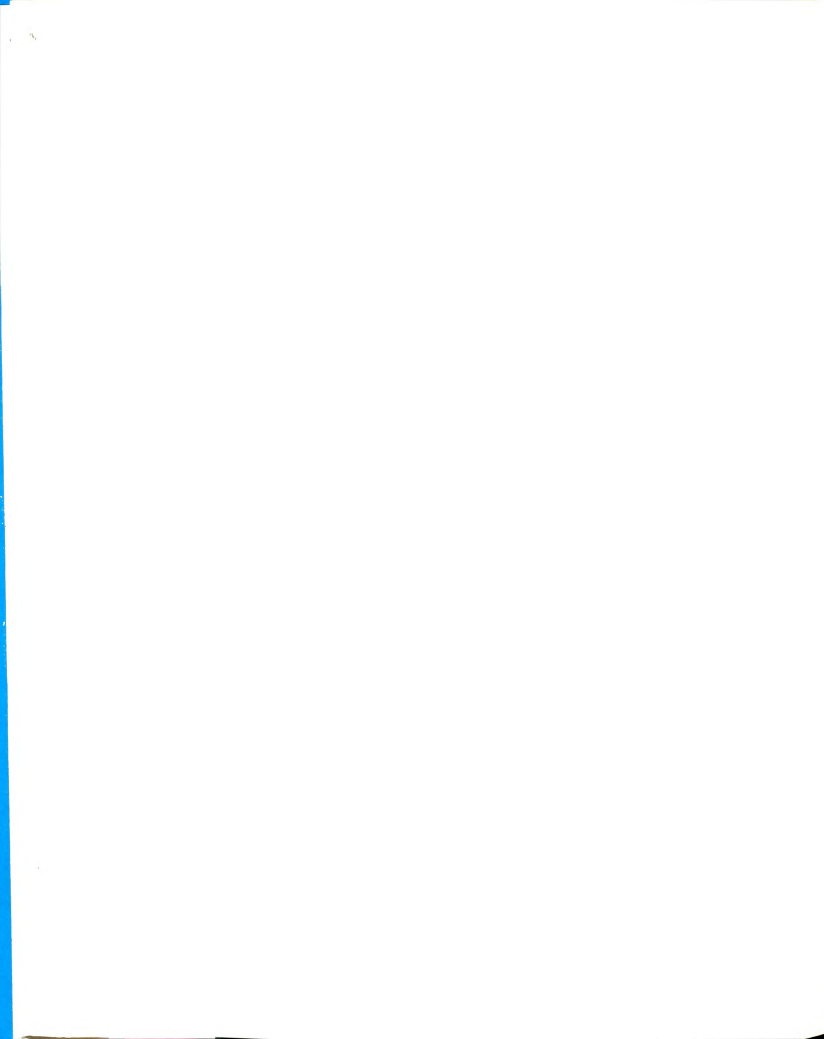
Correlation coefficients may be computed in various ways, depending upon the nature of the data. The most common is the Pearson Product-Moment Correlation Coefficient. Such a correlation coefficient takes into account not only the individual's position in the group, but also the amount of his deviation above or below the mean.¹¹

The correlation coefficient is particularly useful as a descriptive statistic for a set of data for the reasons stated by Hayes: "It is not necessary to make any assumptions at all about the form of the distribution, the variability of Y scores within X columns or arrays, or the true level of measurement represented by the scores in order to employ linear regression and correlation indices to describe a given set of data."¹²

To test the next two hypotheses regarding users and non-users of graphics services (generally stated, these hypotheses are that users will (1) be more open-minded as measured by Dogmatism Scale scores, and (2) have a more favorable attitude toward educational media

¹¹ Anne Anastasi, Psychological Testing, New York: The MacMillan Company, 1954, pp. 103-104.

¹² William L. Hayes, Statistics for Psychologists, New York: Holt, Rinehart and Winston, 1963, p. 510.



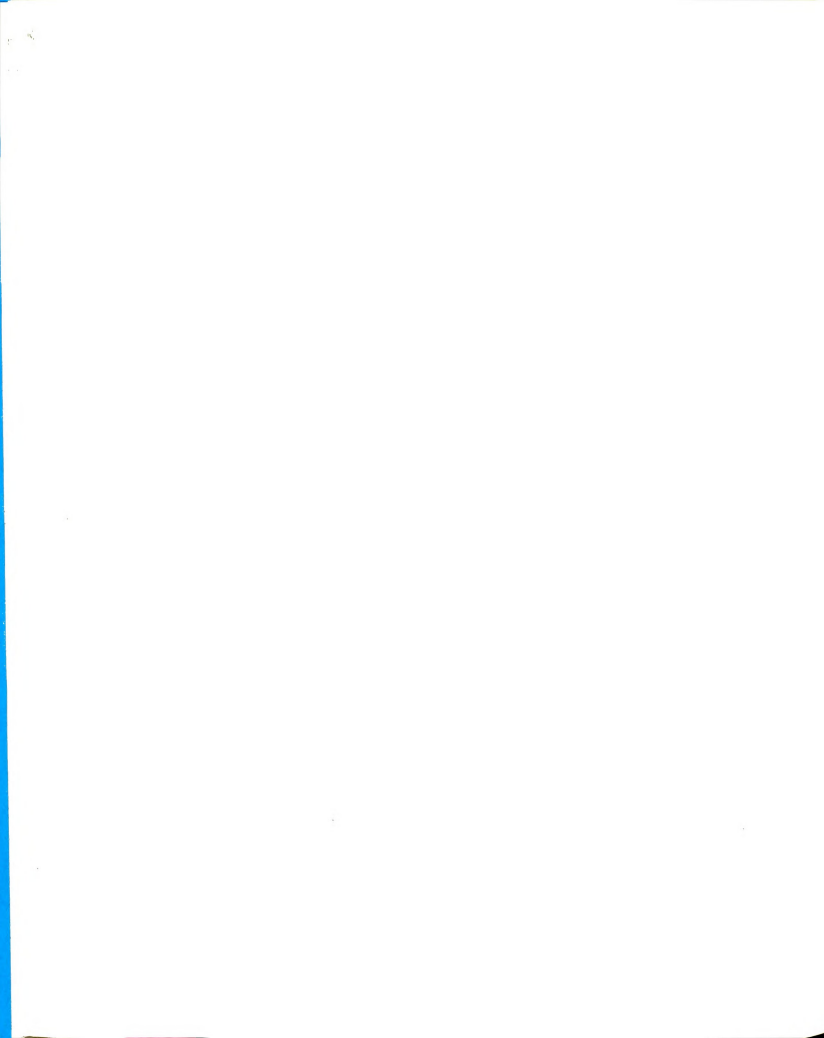
as determined by the New Educational Media Attitude inventory scores), a chi-square test was employed for its ease of computation and for the few assumptions which it requires. Faculty were designated high or low dogmatics, and high or low in attitude toward educational media, by dichotomizing on the means of the two scores.

Siegel says of the chi-square: "The technique is of the goodness-of-fit type in that it may be used to test whether a significant difference exists between an observed number of objects or responses falling in each category and an expected number based on the null hypothesis." (Siegel's underlining)¹³ The exact statistic used in this part of the study comes from Hayes¹⁴ and uses Yates correction for continuity for a somewhat better approximation of the exact multinomial probability.

The way in which these statistics were used to test the hypotheses of this study will be described in the next chapter.

¹³Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences, New York: McGraw-Hill Book Company, 1956, p. 43.

¹⁴William L. Hayes, op. cit., p. 596.



Chapter IV

ANALYSIS OF RESULTS

A compilation of the findings of the study is reported in this chapter: (1) the relationship between scores obtained with the New Educational Media Attitude inventory and the Rokeach Dogmatism scale; (2) the difference of scores obtained on the Rokeach Dogmatism scale for groups of faculty who are considered users and for those who are considered non-users of graphics in teaching; and (3) the difference of scores found with the New Educational Media Attitude inventory for groups of faculty who are considered users and for those who are considered non-users of graphics in teaching.

FINDINGS OF THE STUDY

The first hypothesis examined in this study has been stated:

- H₁: There will be a correlation between belief system scores indicating "open-mindedness" and media attitude scores which indicate "favorable" attitude towards the use of media in education.

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The following null hypothesis was tested:

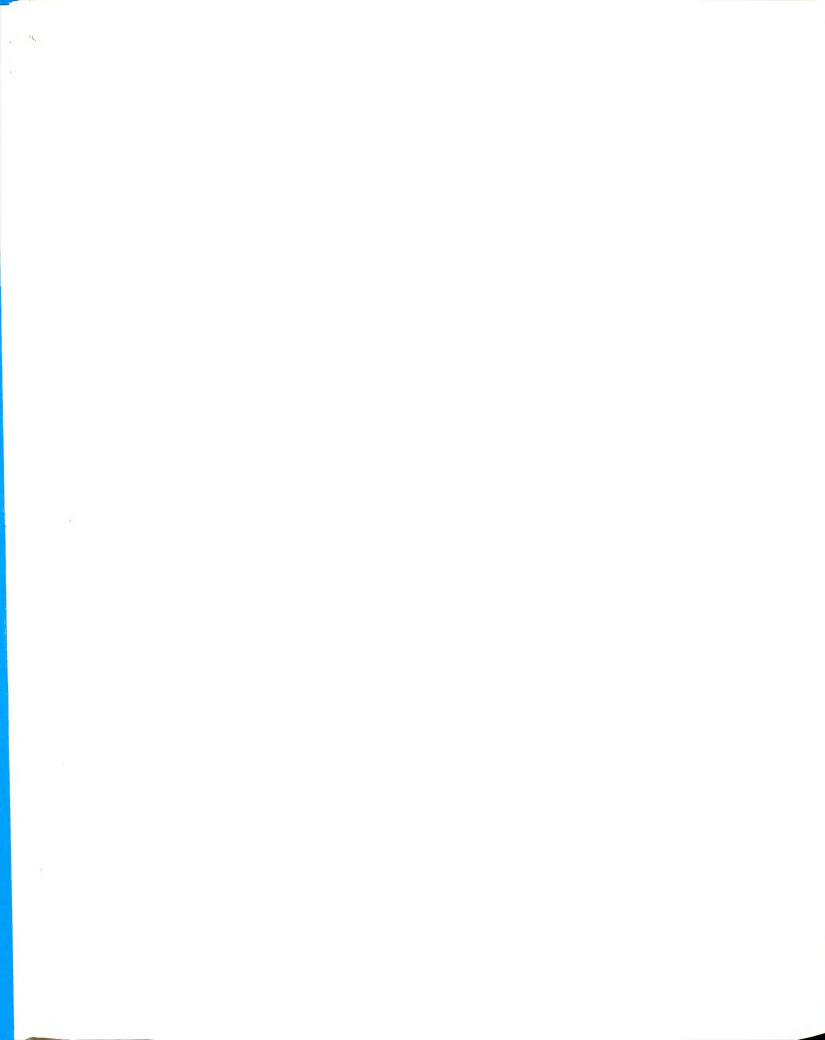
H_{O_1} : There will be no correlation between
the scores obtained with the New
Educational Media Attitude inventory
and the scores obtained with the
Rokeach Dogmatism scale.

Symbolically: $H_{O_1} : r = 0$.

To determine the relationship between the two sets of scores, a Pearson Product-Moment correlation was computed. This computation assumes that homogeneity of variance exists. This was tested with the F test. The assumption of homogeneity of variance can be assumed if a ratio of the variances does not produce an F which exceeds the critical value of F at the .05 level of confidence.¹ An F of 1.26 was obtained. An F of 1.80 or larger is required to reject the hypothesis that the variances are homogeneous. Homogeneity of variances can therefore be assumed.

A correlation of .29 was obtained for the two sets of scores which represented open-mindedness and favorable attitude toward media. To test the significance

¹Allen L. Edwards, Experimental Design in Psychological Research, New York: Holt, Rinehart and Winston, 1960, pp. 104-106.



of this correlation a t test of the hypothesis of zero correlation was computed.² A t of 1.74 (df = 34) was obtained. The probability of t = 1.69 is .05 for a one-tailed test. The null hypothesis is therefore rejected at the .05 level of significance and evidence was obtained for the hypothesis that there is a correlation between those who are open-minded in their belief systems and those who are favorable toward the use of media in the teaching-learning process.

The second hypothesis to be examined in this study is:

H₂: Faculty members who use graphics in the teaching process are more open in their belief systems than similar faculty who do not use graphics in teaching.

The following null hypothesis was tested:

H₀₂: The proportion of faculty having low dogmatism scores (i.e., open-minded belief systems) will be the same for users of graphics as for non-users of graphics.

To test the null hypothesis that users and non-users of graphics have the same proportion of high and

²Ibid., p. 78.

low dogmatics, a chi-square test was employed. By dichotomizing on the means of the two groups the following table was produced:

TABLE I. -- Distribution of faculty with open and closed belief systems for users and non-users of graphics in teaching.

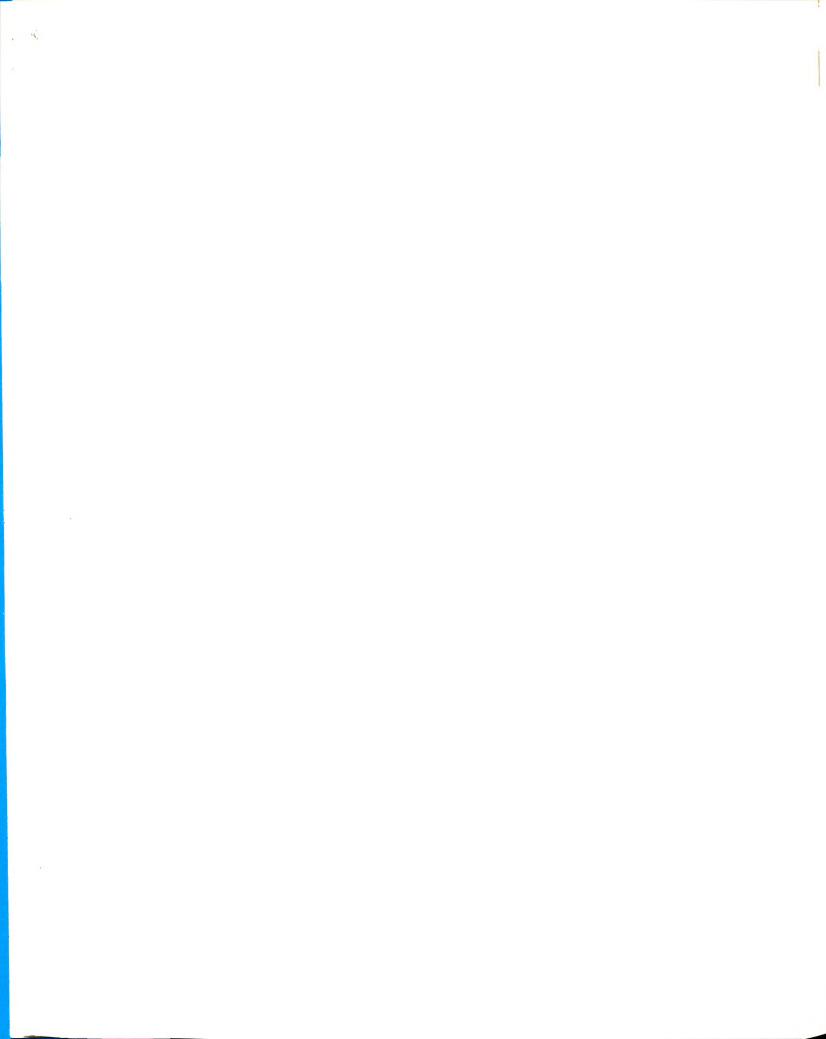
Faculty	High Dogmatics	Low Dogmatics
Users	7	11
Non-users	8	10

Following the procedure set by Hayes which incorporates Yates' correction for continuity³, a chi-square value was obtained which was not significant. The null hypothesis cannot be rejected.

The third hypothesis to be examined in this study is:

H₃: Faculty members who are considered users of graphics in teaching will have a more favorable attitude toward all educational

³Hayes, op. cit., p. 596.



media than faculty members who are considered non-users of graphics in teaching.

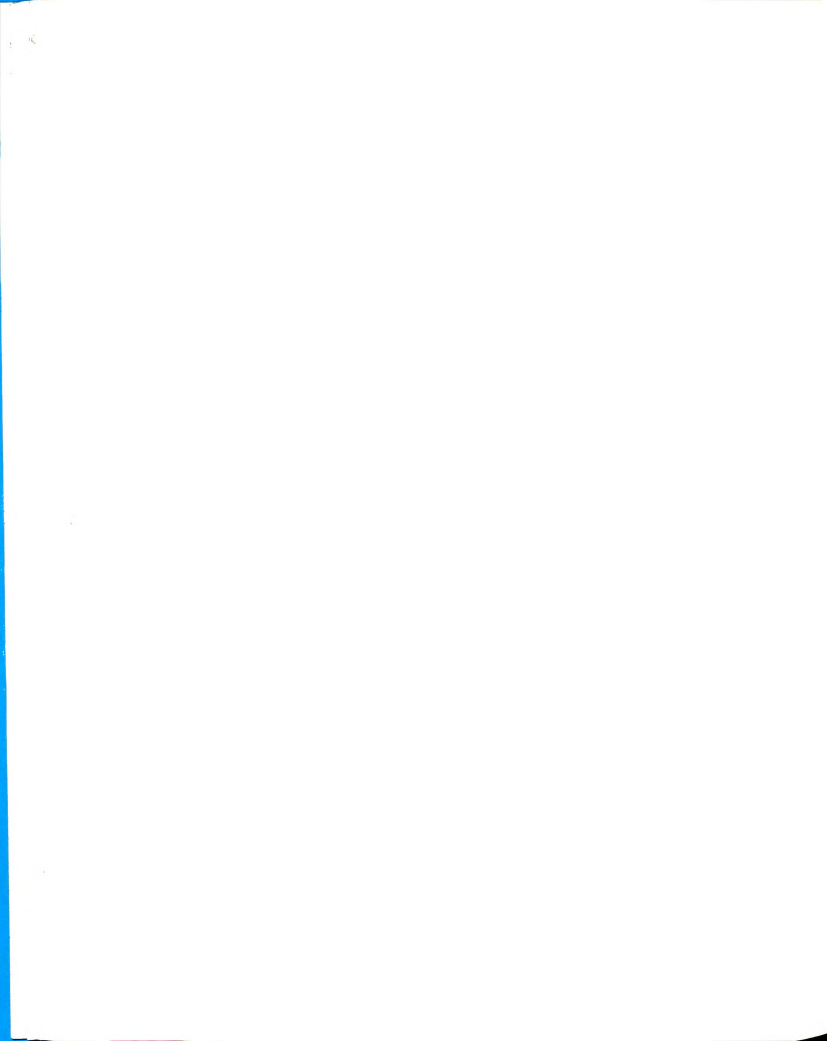
The following null hypothesis was tested:

H_{03} : The proportion of faculty having favorable media attitude scores will be the same for users of graphics as for non-users.

To test the null hypothesis that users and non-users of graphics have the same proportion of favorable and unfavorable educational media attitude scores, a chi-square test was again employed. By dichotomizing on the means of the two groups the following table was produced.

TABLE II. -- Distribution of faculty with favorable and unfavorable educational media attitude scores for users and non-users of graphics in teaching.

Faculty	Favorable	Unfavorable
Users	12	6
Non-users	5	13

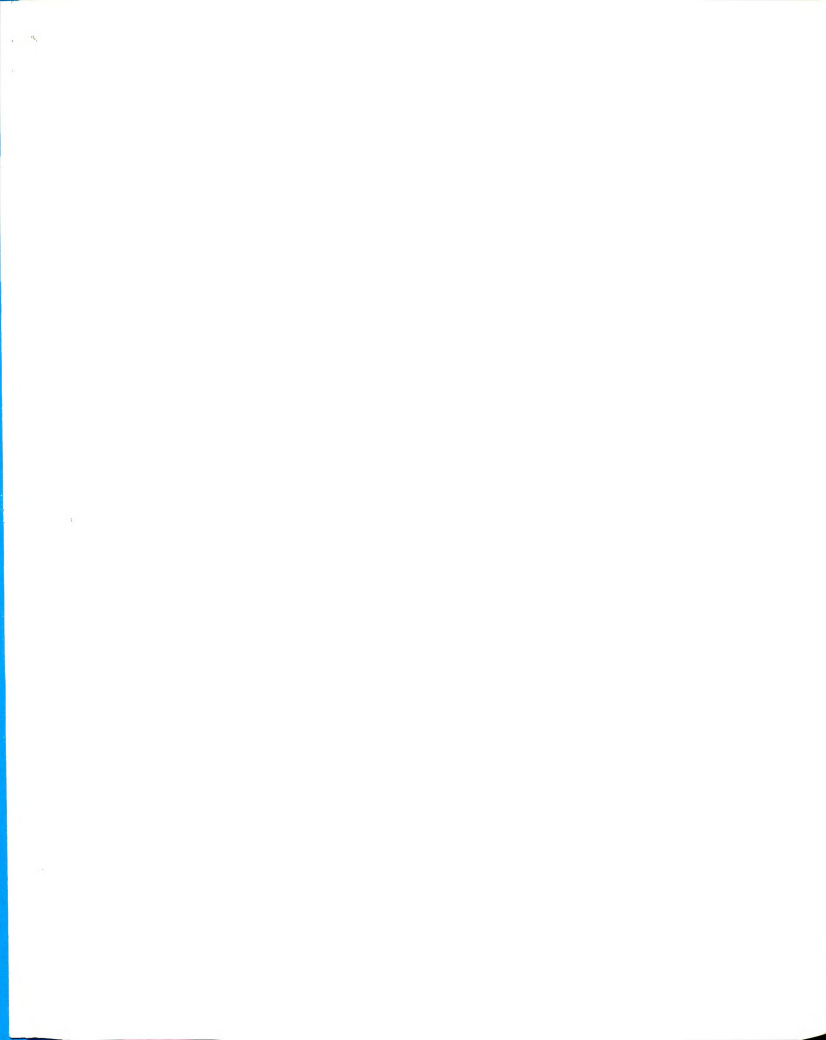


The chi-square obtained (again, using a formula with correction for continuity) was 4.02. At the specified level of significance, $\alpha = .05$, a chi-square equal to or greater than 3.84 with one degree of freedom was needed to reject the null hypothesis. Since the obtained value was greater than 3.84, the null hypothesis was rejected.

Discussion of the Findings

Two of the three hypotheses examined in this study were supported by the data. The first hypothesis dealt with the relationship of belief systems to attitudes toward educational media. It was found that for all faculty examined there was a significant correlation between scores representing open- and closed-mindedness and scores representing a favorable or unfavorable attitude toward educational media. Faculty who were open-minded in their belief systems tended to be favorable in their attitude toward the use of educational media.

Several factors must be taken into consideration when examining these findings. First, of course, is the small number of faculty involved. Although the obtained correlation was significant at the .05 level of confidence, any attempt to generalize must take into

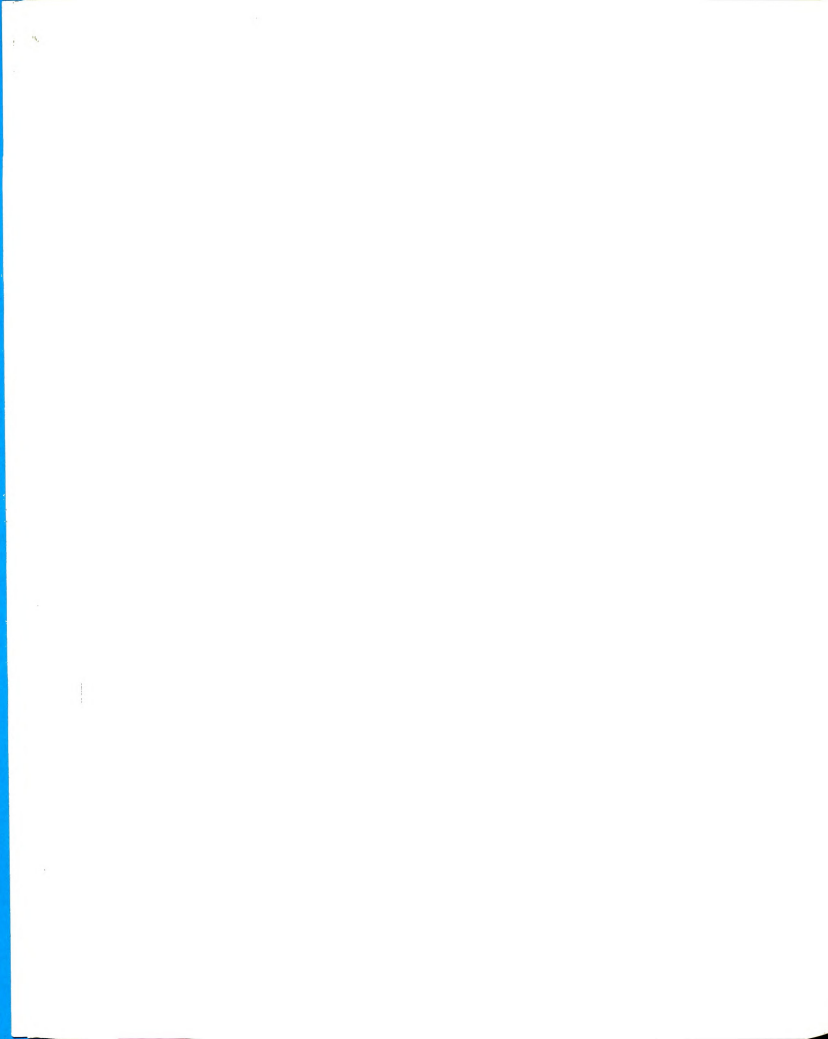


consideration that the faculty obtained through the procedures discussed earlier were selected from a population of faculty members who requested services from the graphics department of the Audiovisual Center. Examination of demographic data shows that this population is not representative of a university faculty.

For example, of the faculty identified by Step 2 (faculty on the user list who had taught at least nine hours), 67 were of the Professor rank, 10 were of the Associate Professor rank, and one was a research associate. Of the 36 faculty who were among the group matched with non-users of graphics, there were 34 with doctoral degrees and only two with master's degrees. This compares to the university average of about 52% of the faculty with doctoral degrees and 46% with master's degrees.⁴

Another factor which must be considered in examining the data is that the New Educational Media Attitude inventory may be subject to a problem common to attitude questionnaires. Rokeach terms this the "attitude-toward situation" and "attitude-toward-object" dilemma. In discussing the problems of adequate attitude measurement,

⁴This data was obtained from a random sample of the complete faculty data card deck; sample N = 185.



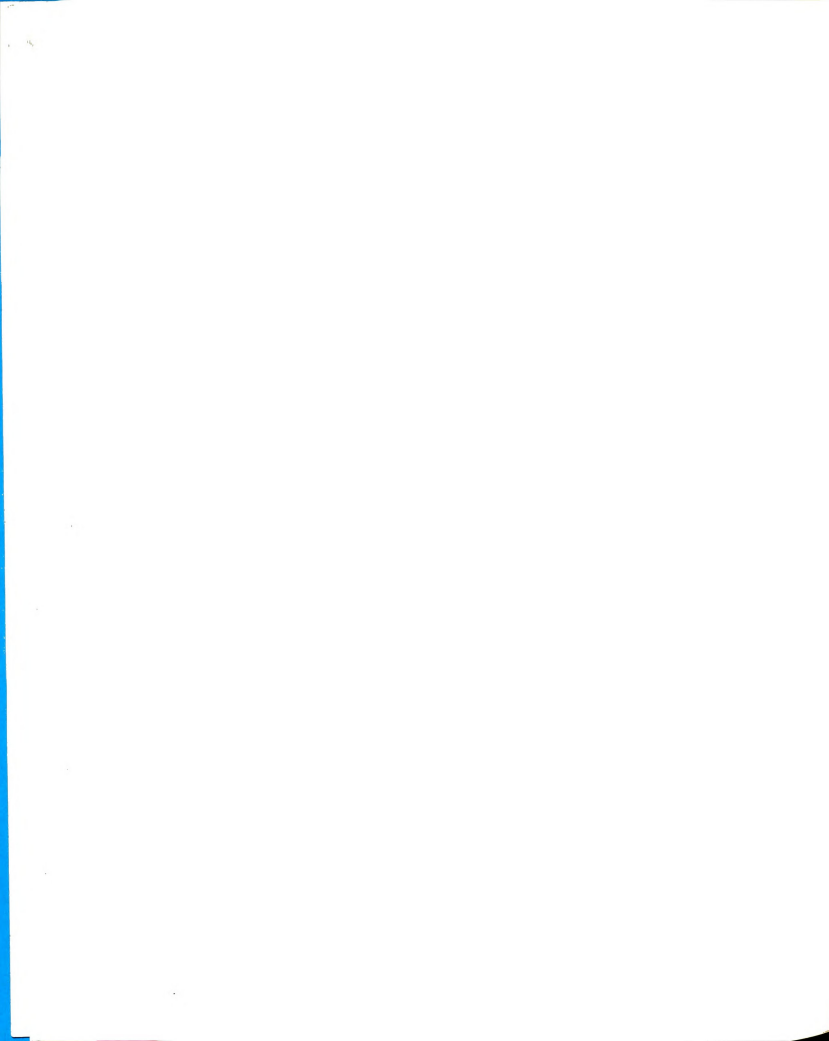
Rokeach states: "Unfortunately, however, only the latter kind of attitude [attitude-toward-object] has thus far been the focus of operational definition and measurement, even though attitudes have typically been more broadly defined as predispositions toward situations as well as toward objects."⁵

Apart from the semantic problem wherein "attitude object" has a rather specific meaning for members of the measurement profession, the situation exists where the feeling of an individual toward specific tools (i.e., a 16mm projector) is not the same as a more general attitude toward an abstract "system" of educational media.

For example, the instructions for the New Educational Media Attitude inventory read: "Radio, television, motion pictures, slides and filmstrips, the phonograph and tape recorders, certain types of teaching machines and programmed learning methods -- all are examples of what might be termed "Newer Educational Media."⁶ While certain teaching situations are implied in this definition of educational media, the emphasis is on the machines or "objects" as opposed to being on the method or

⁵Rokeach, op. cit., p. 12.

⁶See Appendix II.



"situation."

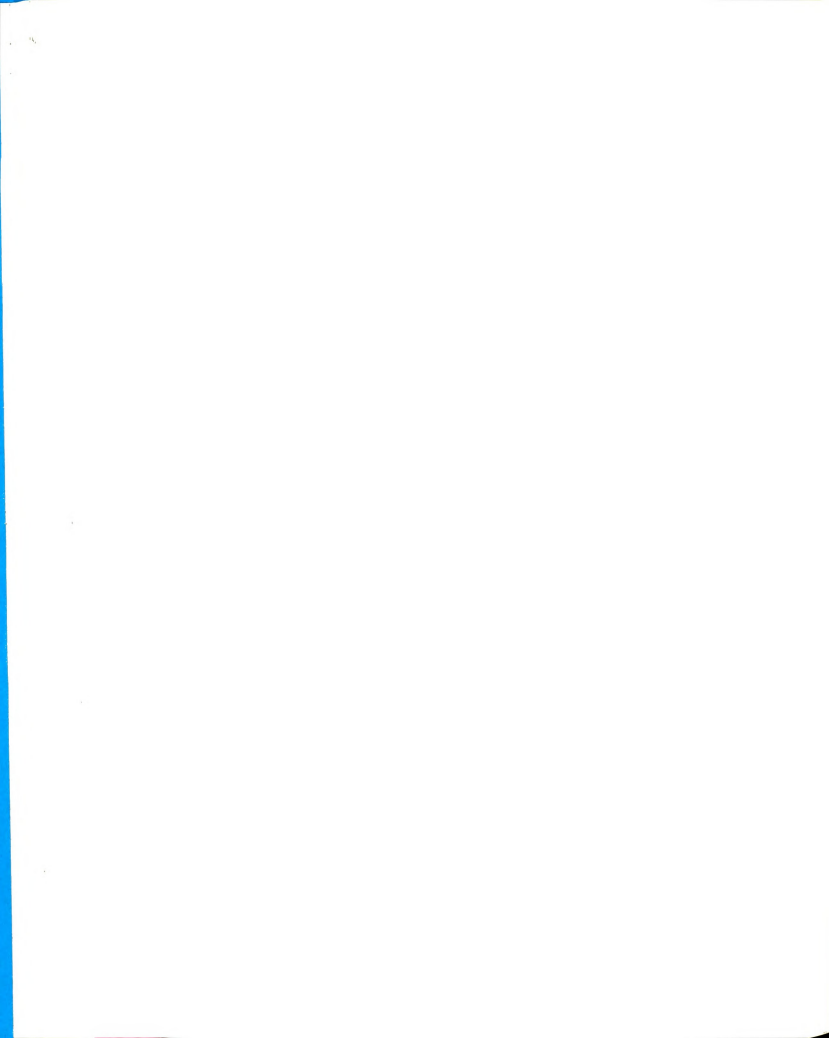
What would be useful is an attitude inventory which would attempt to measure an individual's feeling about the use of systems of instruction which involve man-machine-materials organization.

The second hypothesis examined in this study dealt with those teachers defined as users of graphics and attempted to predict that they would be more open in their belief systems than similar teachers who did not use graphics. The data did not support this hypothesis, even though the data were in the predicted direction.

Several factors might be considered in looking at the lack of significant findings. First, the two groups are small with a consequent high standard error of estimate.

Second, there may be uncontrolled concomitant variables operating within one group which are masking the relationship between open-closed-mindedness and extent of use of graphics. For example, if the user group alone is examined between belief system and attitude toward media, an r of .47 is obtained (significant at the .05 level). This is compared to an r of .10 for the non-user group, which is not significant.

Obviously, the correlation obtained in testing the first hypothesis reflects a co-relationship present

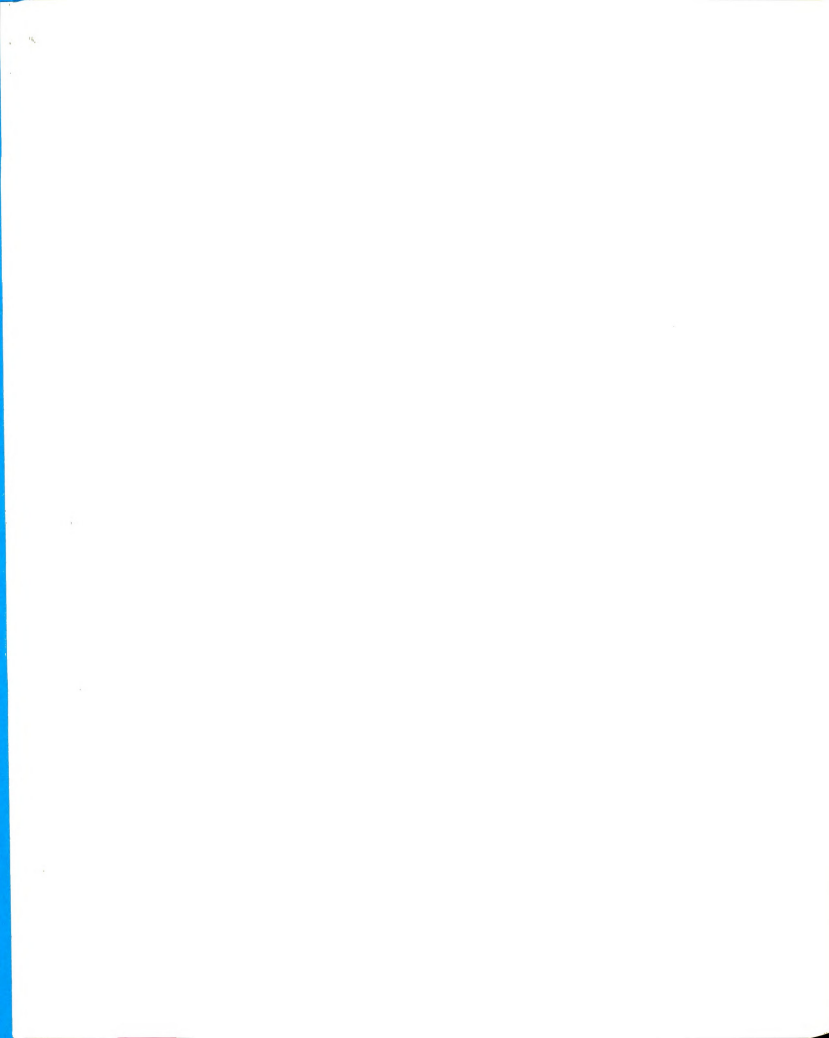


primarily in the user group. No conclusion is offered that a difference between groups would have been found if the correlation existed in both groups, but only that there are uncontrolled variables which are affecting the groups differentially.

The third hypothesis examined dealt with the attitudes of faculty who were identified as users of graphics in the teaching process, and their scores obtained on the New Educational Media Attitude inventory. The hypothesis stated that users of graphics would be more apt to have a favorable attitude toward all educational media than non-users, and the data clearly support this contention.

An important aspect of testing this hypothesis was extending the validation of the New Educational Media Attitude inventory, for as Ramsey suggests: "Another fruitful area of research would be to attempt to correlate attitude findings with some sort of critical incidents or with behavioral phenomena regarding the uses of newer educational media."⁷ The "critical incidents" in the present study involve the identification of faculty who use media. These faculty are shown

⁷Ramsey, op. cit., p. 20.



to have a more favorable attitude with the Ramsey instrument than do similar faculty who are considered non-users. Although this will be discussed further in Chapter V, it is reasonable to assume at this point that additional confidence can be assumed in using the New Educational Media Attitude inventory to measure the attitudes of teachers toward educational media.

Summary of the Results

Three hypotheses were examined in this study. The first dealt with the relationship of belief system scores to attitudes toward educational media:

H_1 : There will be a correlation between belief system scores indicating "open-mindedness" and media attitude scores which indicate "favorable" attitude toward the use of media in education.

The null of the hypothesis was rejected at the .05 level of significance and evidence was obtained for the hypothesis that there is a correlation between those who are open-minded in their belief systems and those who are favorable toward the use of media in the teaching process.

The second hypothesis examined dealt with two identified groups of faculty. The first group was considered users of graphics in teaching; the second group was similar in respect to certain identified criteria but the faculty were considered non-users of graphics in teaching. The hypothesis to be examined was:

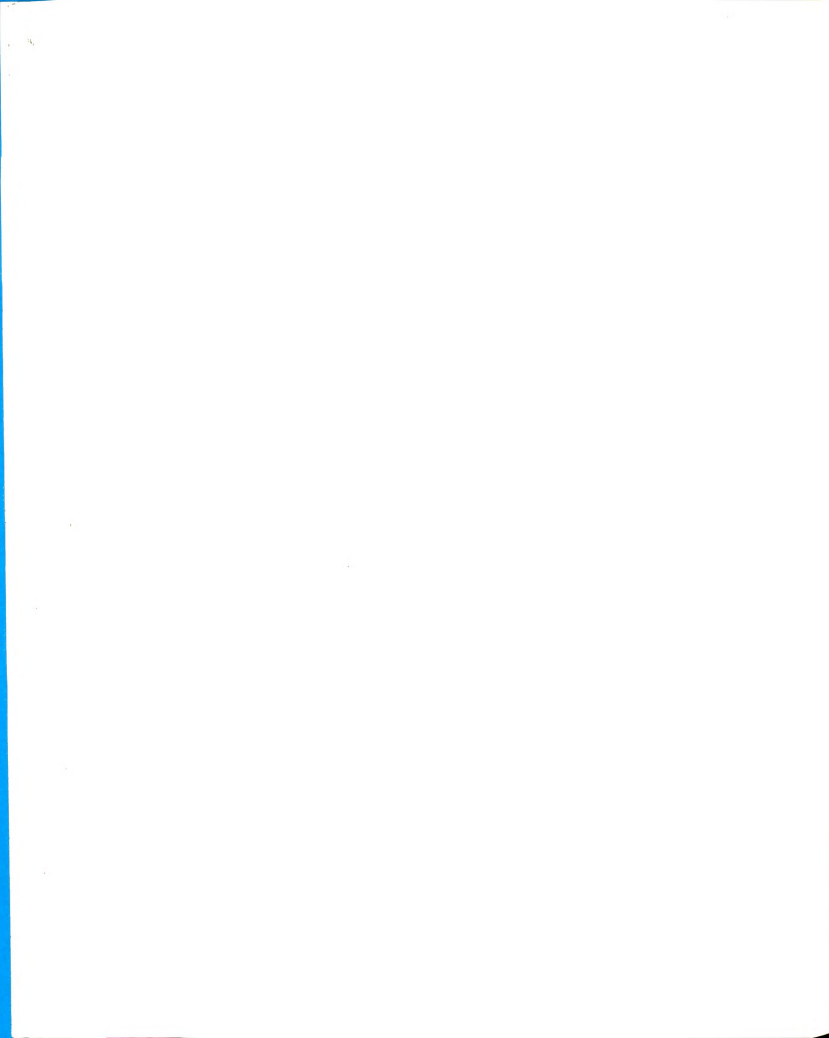
H₂: Faculty members who use graphics in the teaching process are more open in their belief systems than similar faculty who do not use graphics in teaching.

Data did not support this hypothesis.

The third hypothesis to be examined again used the two groups of faculty identified as users and non-users of graphics. The hypothesis was:

H₃: Faculty members who use graphics in the teaching process will have a more favorable attitude toward educational media than similar faculty who do not use graphics in teaching.

The null of the hypothesis was clearly rejected at the .05 level of significance and evidence was obtained



for the hypothesis that faculty who use graphics will generally have a more favorable attitude toward educational media than similar faculty who do not use graphics in teaching.

Chapter V

SUMMARY AND CONCLUSIONS

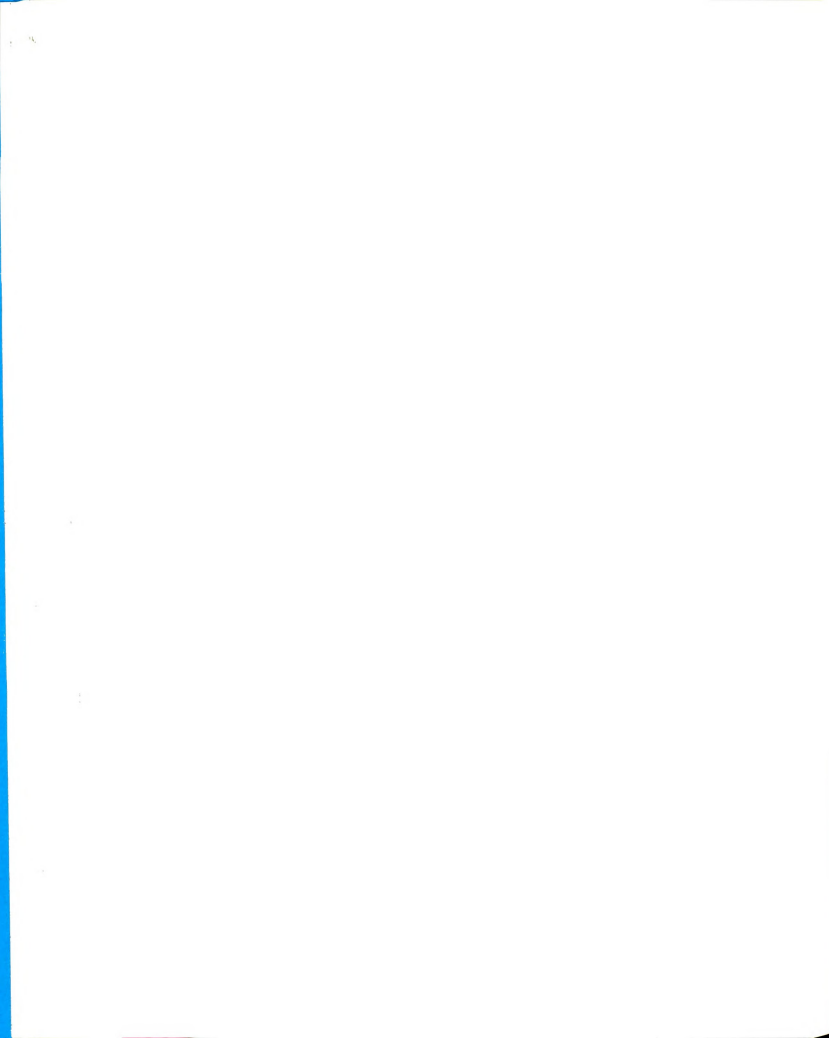
This study examined the relationship between two constructs: open- and closed-mindedness and attitude toward educational media. Hypotheses were tested for evidence that faculty who are open-minded, and faculty who hold a favorable attitude towards the use of media, act differently in the teaching process than those faculty who are closed-minded and who do not view media with a favorable attitude.

SUMMARY

Three hypotheses were formulated:

H₁: There will be a correlation between belief system scores indicating "open-mindedness" and media attitude scores which indicate "favorable" attitude toward the use of media in education.

H₂: Faculty members who use graphics in the teaching process will be more open



in their belief systems than similar faculty who do not use graphics in teaching.

H₃: Faculty members who use graphics in the teaching process will have a more favorable attitude toward educational media than similar faculty who do not use graphics in teaching.

This study made use of two faculty groups. One group, identified as users of graphics, was selected from the total population of faculty teaching at least nine credit hours during the academic year who were billed for graphics services during the fiscal year, 1963-64, by the AV Center at Michigan State University. Members of the user group were also identified as to department, rank, age, highest degree held, length of service at Michigan State University, and percentage of teaching at the graduate or undergraduate level.

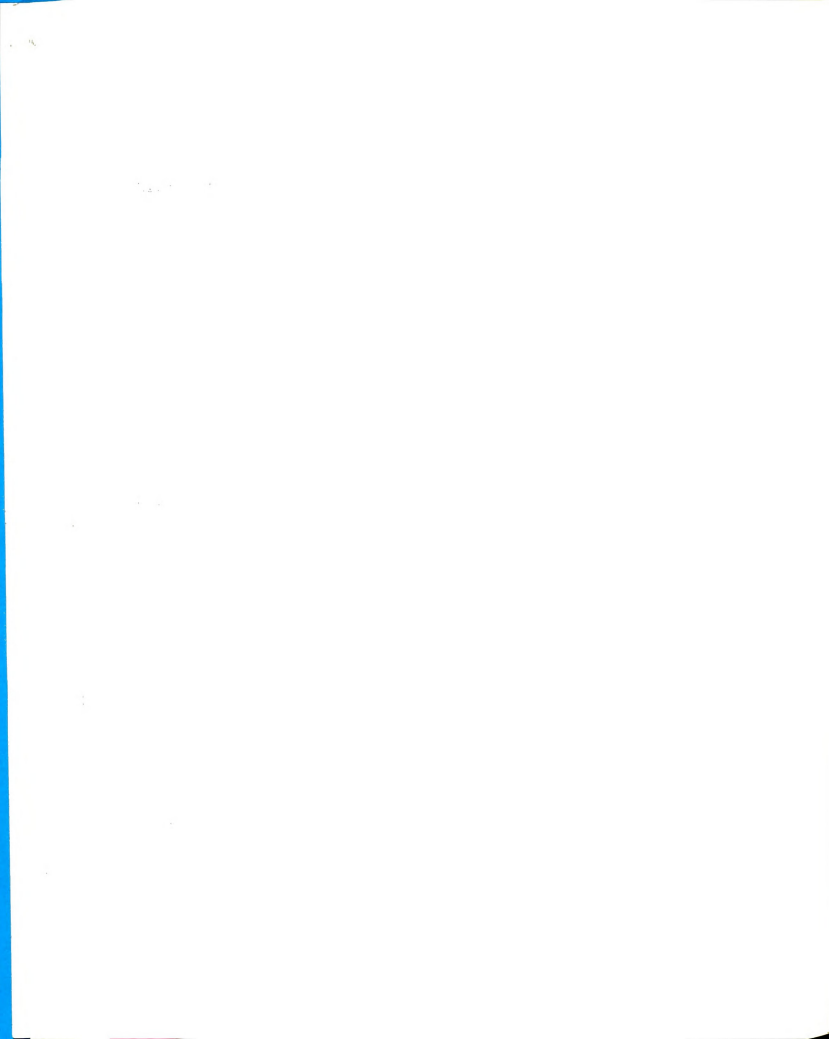
The second group consisted of faculty members matched with the user group on the above criteria except that these faculty had used graphics in teaching nine or fewer times during the 1964-65 academic year. Faculty of both groups were given three instruments: The Rokeach Dogmatism scale, the New Educational Media Attitude

inventory, and a questionnaire designed to obtain data about the samples.

The first hypothesis dealt with the correlation of belief systems with attitudes toward educational media. It was predicted that faculty open-minded in their belief systems would tend to be favorable in their attitudes toward educational media. This was found to be true to the extent that scores from the belief system instrument correlated with scores from the educational media attitude instrument.

The second hypothesis stated that those faculty who were identified as users of graphics would be more open in their belief systems than similar faculty who do not use graphics. The null of this hypothesis could not be rejected.

The third hypothesis dealt with attitudes toward educational media by the two groups of faculty. It was predicted that those faculty using graphics would have a more favorable attitude toward all educational media than faculty not using graphics. The data clearly support this hypothesis.

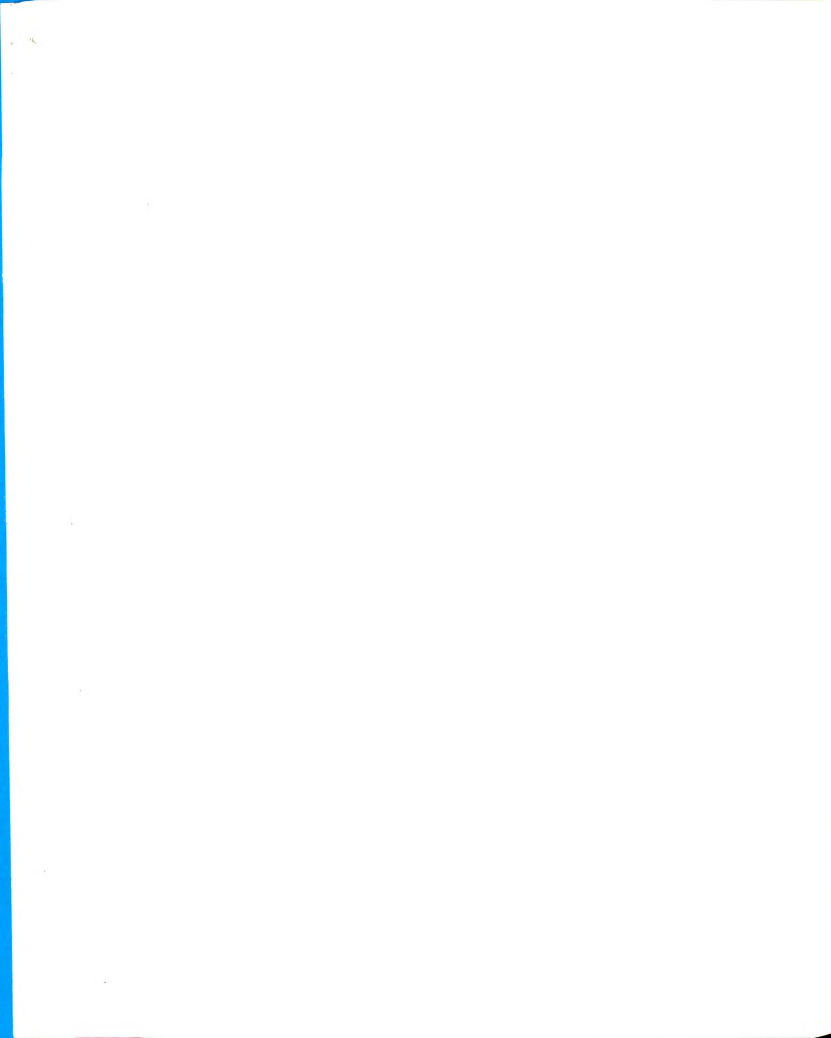


CONCLUSIONS

This study has dealt with two broad constructs, and the relationship between them for specified groups of individuals. The first of these is generally called open- and closed-mindedness, which was measured by the Rokeach Dogmatism Scale. The second of these is termed attitude toward educational media, measured by the New Educational Media Attitude inventory.

Any discussion of the relationship of the two instruments needs to keep two major factors in mind. First, these instruments deal with relatively broad, abstract ideas about how people feel and believe. Because of this, any specific conclusions will inevitably be broad and abstract in that they cannot represent more specificity than is inherent in the original instruments.

Second, while two of the three hypotheses involved groups differentiated on the basis of observable differences in overt behavior (the demonstrated use of graphic services), it must be recognized that the direct relationship between psychological constructs and behavior is subject to many intervening factors. These factors may support the inclination of an individual to behave in accordance with the construct, or these factors may stifle the predisposition.



Given these limitations, and given the fact that this study represents but a small effort to understand the process of innovation and planned change, the following conclusions seem reasonable.

The first of the conclusions reached in this study is that faculty who are open-minded are more apt to have a favorable attitude toward the use of educational media in the teaching-learning process than faculty who are closed-minded.

The knowledge that there is a relationship between belief systems and attitude toward media suggests several areas which might be the basis for further research. Conway, for example, found, in a study cited previously,¹ that the process of interaction in problem solving was facilitated by having groups of all open-minded people. If a group of only open-minded faculty was given the problem of devising new instructional techniques, would they arrive at more efficacious solutions in less time than would a group of faculty that consisted of individuals with both open- and closed-belief systems? Could such a group of open-minded faculty provide better

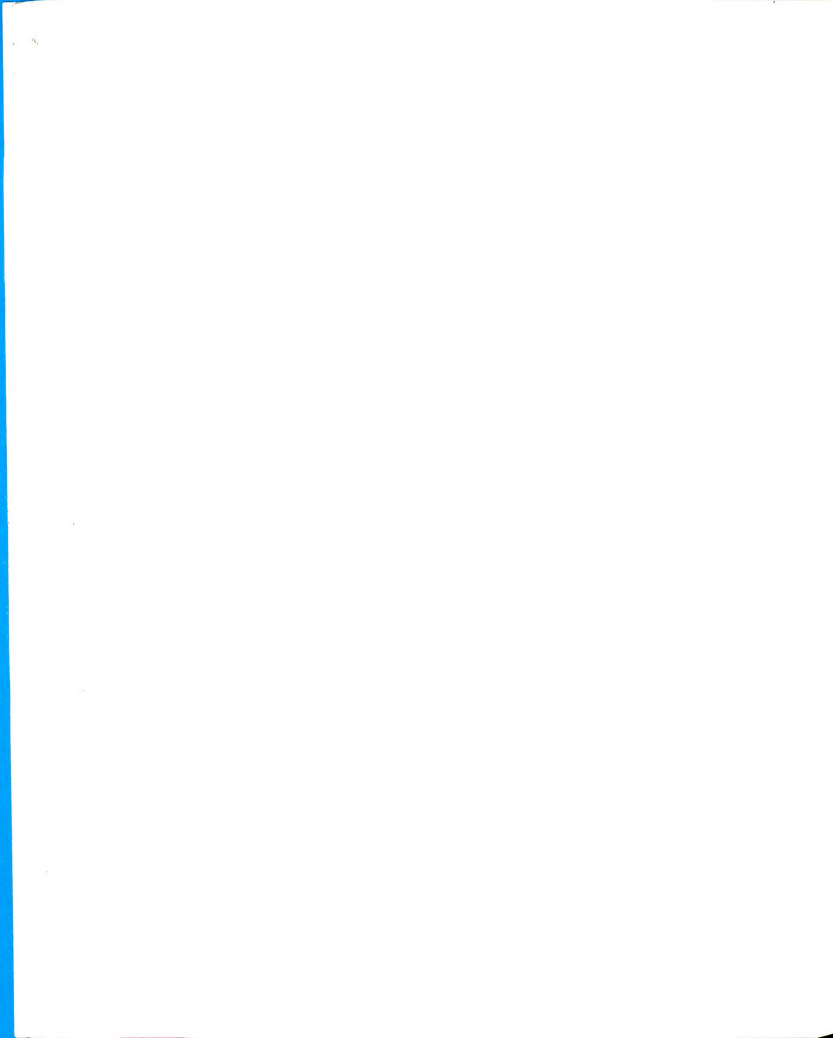
¹James A. Conway, Problem Solving in Small Groups as a Function of "Open Minded" and "Closed Minded" Behavior: Some Implications for Development of Administrative Theory, unpublished doctoral dissertation, State University of New York at Albany, 1963.

guidance for the media coordinator with respect to developing educational systems than an "average" group?

The media change agent might also want to examine innovation diffusion patterns with respect to groups of faculty having different belief systems. Theory underlying the dogmatism scale would suggest that open-minded faculty would be more receptive to the possibility of new educational systems and would be more constructive in their criticism relative to the effectiveness of the system.

It is also suggested that the media attitude instrument may need closer scrutiny if used in further research. As indicated earlier, the question of attitude toward "media" can be viewed in at least two ways. First, media can be perceived as aids to instruction. That is, the materials are used as a supplement to the existing teaching pattern. Second, media can be perceived as being a complementary part of the instructional process wherein the materials used are an essential part of the learning process.

One can speculate that the open-minded person would be able to accept both viewpoints, whereas the closed-minded person would reject media as a complementary part of the instructional process.



The second of the hypotheses tested in this study stated that a group of faculty identified as users of graphics would be more open in their belief systems than a similar group of faculty who were considered non-users. The difference between the groups was not significant.

The second major conclusion drawn from this study deals with the third hypothesis tested. This hypothesis stated that a group of faculty identified as users of graphics would be more favorable in their attitude toward all educational media than would a similar group of faculty who were considered non-users of graphics. The data clearly support this hypothesis and it seems reasonable to conclude that faculty who use graphics in teaching would also have a favorable attitude toward the use of other media in the classroom.

This conclusion is reached in spite of some unanswered questions concerning faculty perception about the role of graphics in relation to class size. Both the groups classified as users and non-users had large and small classes, but the data suggest that users tend to be involved in teaching larger classes. Whether the responsibility for teaching larger classes caused the teacher to consider graphics as a source of communication, or whether those prone to assume responsibility

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for large classes are also disposed toward the use of media, cannot be answered at this time.

This same "chicken and egg" question was also a problem for Guba and Snyder in their study of teachers who used instructional television: "We have seen some data from the Background Questionnaire which tend to support the idea that the choice of ITV was often not up to the teacher . . ."², and yet in spite of this lack of choice on the part of the teachers, ". . . we may note that the using group [of ITV] displays a substantially and significantly more favorable attitude toward the newer educational media than does the non-using group."³

Implications for the Media Change Agent

The present research should be useful for persons playing a number of roles within the educational setting. These roles will be referred to in this discussion in terms of the "media change agent," an individual

²Egon B. Guba and Clinton A. Snyder, Instructional Television and the Classroom Teacher, RF Project 1367, Final Report, Research Foundation, Columbus, Ohio (Ohio State University), April, 1964, p. 62.

³Ibid.

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(or institution) concerned with designing and implementing man-machine-materials educational systems.

The two attitude instruments utilized in this study should prove heuristically useful to media change agents. As the change agents become involved in systems planning and systems development, it is suggested that they should investigate further the constructs of open- and closed-mindedness and media attitude.

For example, having a tool for measuring faculty attitude toward educational media gives the researcher an opportunity to study questions such as: "Which comes first, the attitude or the media?" Research of this sort might extend the work of Evans cited previously in which he used Festinger's "forced compliance" theory to explain a shift of faculty attitude. In his work, Evans found that faculty who had a strong negative feeling against ITV and who were exposed to the video tape recorder as a research device for the improvement of their teaching habits later changed their attitude and used the device to teach courses by television. Festinger's theories may also explain in part the findings of Guba and Snyder mentioned above.

Another possibility for the use of known media attitudes involves the change agent's role as a "probability expert."

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We propose that a midpoint between unrealistic demands for predictability and control and defeatist acceptance of the all-too-true realities of unanticipative consequences is the position for the change agent to occupy. He must become a "probability expert". He should be a gambling man, who eschews "sure bets" and "long shots" simultaneously. But, like a professional gambler, he should seek the bets that give him a probability edge over pure chance. 4

Whether the media specialist could use knowledge of media attitudes to identify those faculty most receptive to the use of new systems in order to shorten the time lag of acceptance for a particular medium, or whether he might use this knowledge to pinpoint pockets of resistance so that greater gains might be made with respect to a particular problem, are questions amenable to research. What knowledge of attitudes toward media does at the moment is to enable the media change-agent to place his bets with probability on his side.

It is suggested that this is true with the construct open-closed-mindedness as well, although the questions which remain unanswered both in theory and practice are formidable. For example, to what extent does the belief system of the change agent affect his relationship with the faculty with whom he works? What is the

⁴Warren G. Bennis, Kenneth D. Benne, and Robert Chin, The Planning of Change, New York: Holt, Rinehart and Winston, 1962, p. 197.

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role of leadership and authority in pulling non-open-minded persons into an effective working relationship with open-minded persons? How can indices of open-mindedness be obtained by the change agent without antagonizing faculty by asking them questions which of necessity tend to be personal?

One can speculate that the construct of open-mindedness might be used in somewhat the same manner as is the construct intelligence. The teacher in a classroom need not know a numerical score from some I.Q. measurement instrument to realize the relative learning potential of the child. The teacher is, however, aware of the construct intelligence and has become sensitive to the actions and reactions of the child which suggest to the teacher ways of involving the child in the learning process.

It may be, therefore, that the media change agent will want to become intuitively sensitive to the construct open-mindedness so that he can judge the actions and reactions of the persons involved in the change process without having to resort to test instrument scores. Not only would knowledge of this construct enable him to know his own limitations in examining new ideas, but he would be able to make maximal use of observation concerning faculty activities and interests.

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If factual data on faculty are available or can easily be obtained, then the research being reported suggests immediate steps that can be taken by the media change agent. First, the New Educational Media Attitude inventory scores might be used to identify those faculty who are potential innovators in the area of media. This would have particular relevance for the solution of problems involving time deadlines.

For example, large classroom instruction precludes the traditional use of the chalkboard. The data suggest that faculty who have used the 2" by 2" slide projector for small classroom use are more apt to use the overhead projector for large classroom instruction.

It is further suggested that the faculty member who has had experience with a variety of media in the classroom is more apt to have a favorable attitude toward the use of media in a "complementary" sense. That is, he would be less resistant to the use of closed-circuit television wherein his teaching itself is mediated.

While it is true that simple observation itself may provide the media change agent with sufficient insight to arrive at these conclusions, the value of the instrument scores is twofold: first, in a system of any size it is difficult for the change agent to keep in mind all of the faculty with whom he works; and

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second, many faculty rely on sources outside the media center for both materials and equipment, and subsequently do not come into contact with the media change agent.

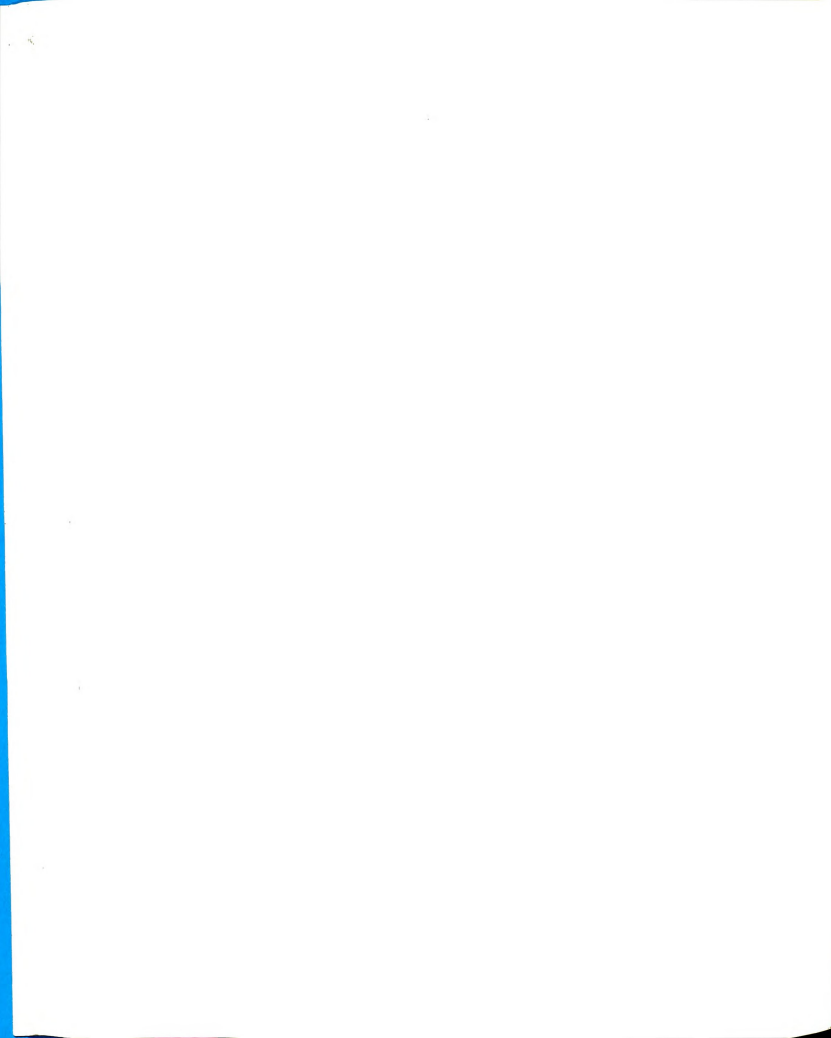
Summary of the Implications

The two conclusions coming from this study deal with (1) the relationship between belief systems and attitude toward media, and (2) the use of the New Educational Media Attitude inventory to identify faculty who find the use of media tools desirable in the classroom.

First, there does seem to be a relationship between faculty who were identified as open-minded and faculty who were favorable toward the use of the newer educational media.

Second, the response of faculty on the media attitude inventory indicates that this instrument can be used to identify faculty who find the use of certain media tools desirable in the classroom, specifically the use of graphics.

It is suggested that knowledge of open-mindedness and attitudes toward media can be used by the media change agent in planning for the utilization of media.

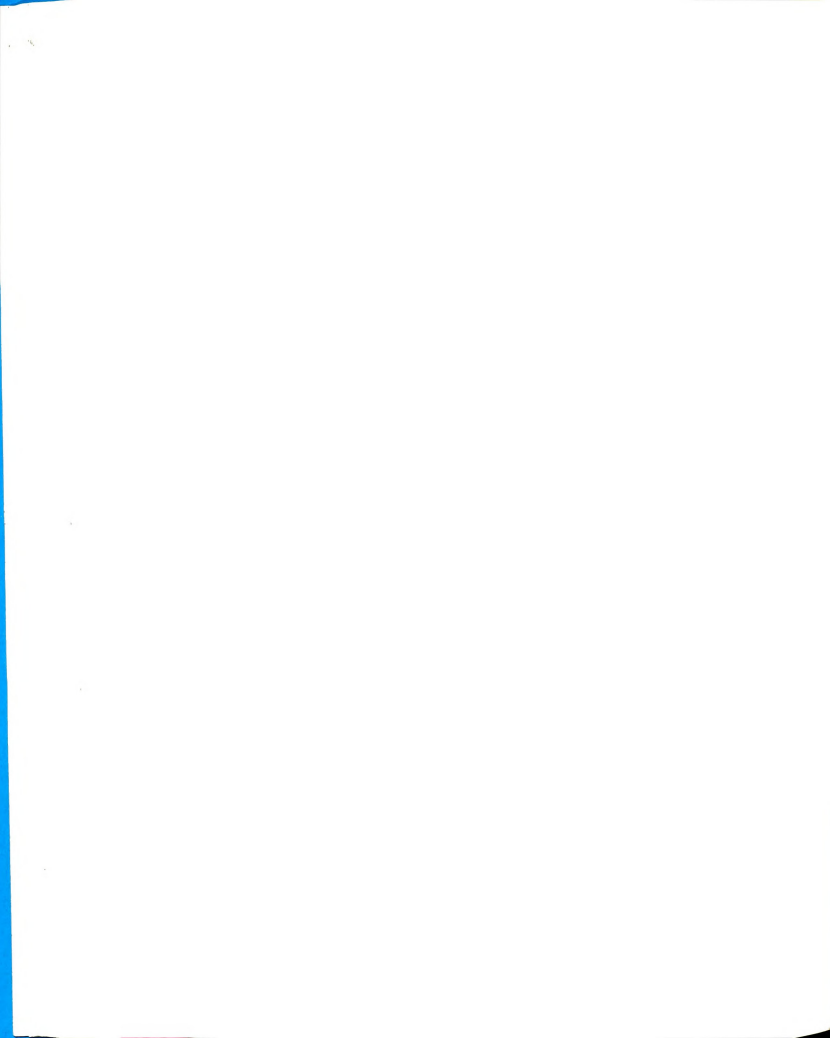


Such information might be used in selecting faculty for the development of educational systems. Where such systems are already in existence, sensitivity to belief system and media attitude relationships might facilitate the involvement of particular faculty members.

Recommendations for Further Study

The first recommendation is that this study be replicated with improved methodology to determine if the investigated relationships are universal or specific to the group examined. Also, because graphics represents but one group of media, the study should be replicated using other media in an attempt to determine the relationship of dogmatism to users of other tools of education.

Because there is a subtle but quite important distinction between the use of media as an aid or supplement to instruction, and the use of media as a complementary or integral part of the instructional process, it is recommended that an instrument be developed which would permit the identification of faculty holding these different attitudes. Such knowledge, for the media change agent, would facilitate the development of educational systems and suggest to him the kinds of

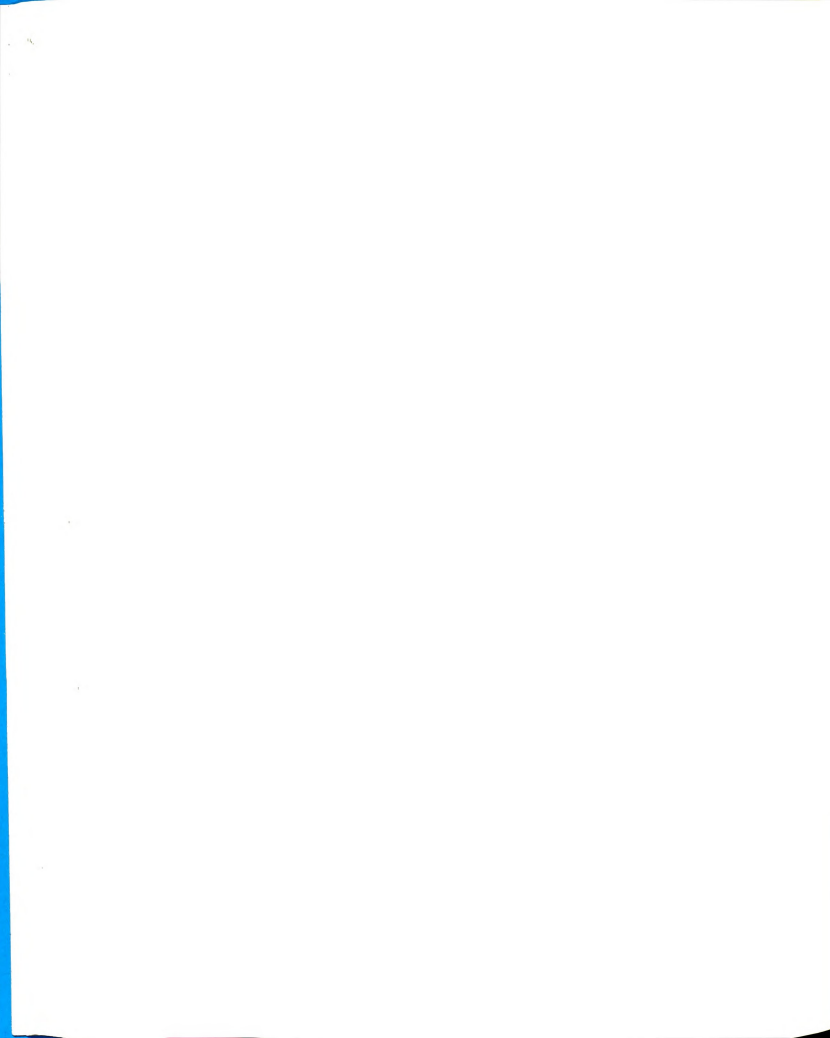


strategies best suited for individual faculty members.

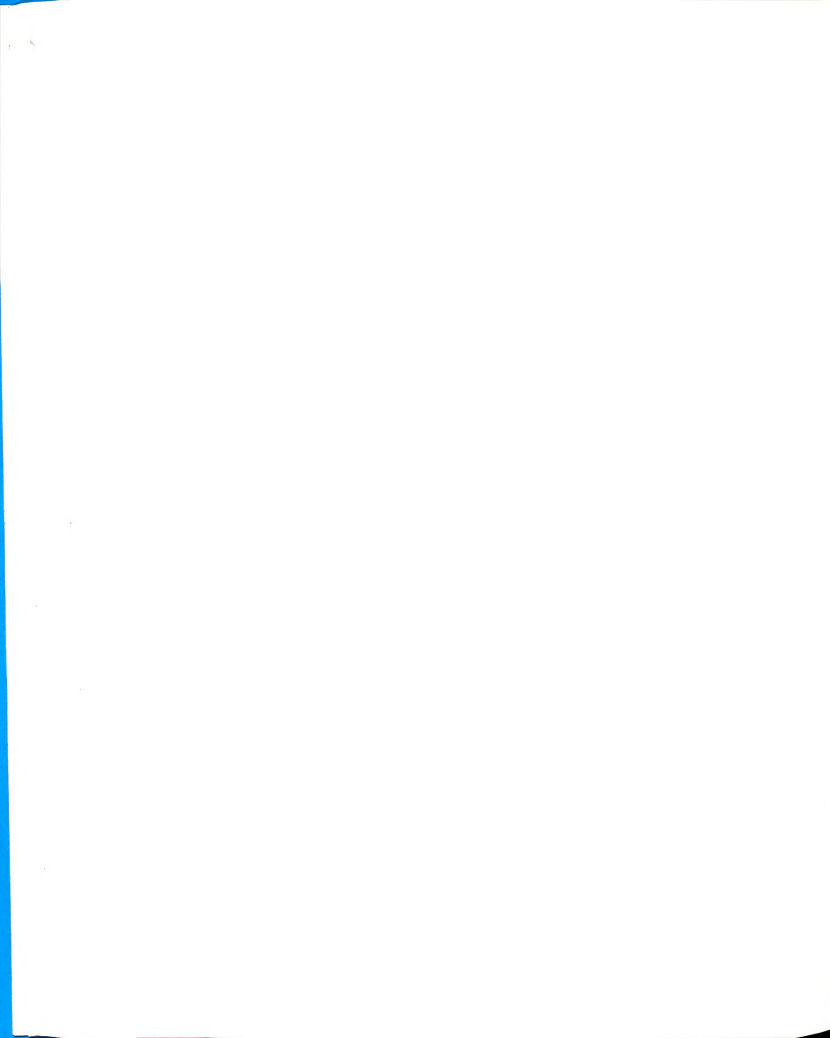
It is suggested that further studies be conducted which would address themselves to the problem of media attitude formation. How does exposure to media affect the development of media attitudes? Answers to this question might suggest several strategies to the media change agent. Another part of the same question may be, what is the relationship between perceived need for media (as in large classroom instruction) and attitude formation?

As indicated previously, the media change agent may want to develop indices of open-mindedness which do not depend upon the Rokeach Dogmatism Scale. Although faculty will submit to this questionnaire for research purposes, the problems of large-scale administration may involve questions of faculty autonomy. Research directed at finding these indices may involve correlational studies, as with the present study, or it may involve sensitivity training on the part of the media change agent so that he can more adequately judge the dogmatism of the individual faculty member with whom he comes into contact.

It is strongly recommended that studies be conducted in the area of open-mindedness and problem-solving which involve the use of media in instruction.



Considerable evidence suggests that educational techniques must change, and change rapidly, in order to maintain quality instruction and yet incorporate new methods of instruction and adequately use new technologies which press from outside the field of education. The value of working with faculty who bring a minimum of irrelevant biases to a problem, and who can act on relevant information received from the outside on its own intrinsic merits, seems clear.



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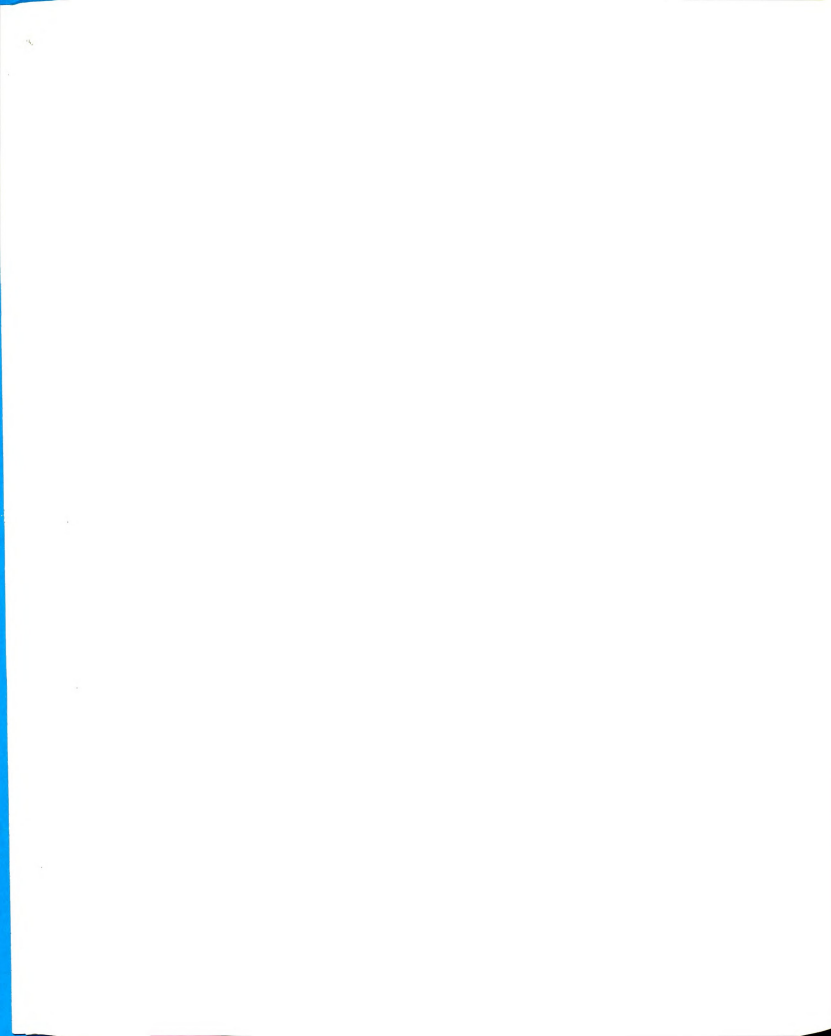
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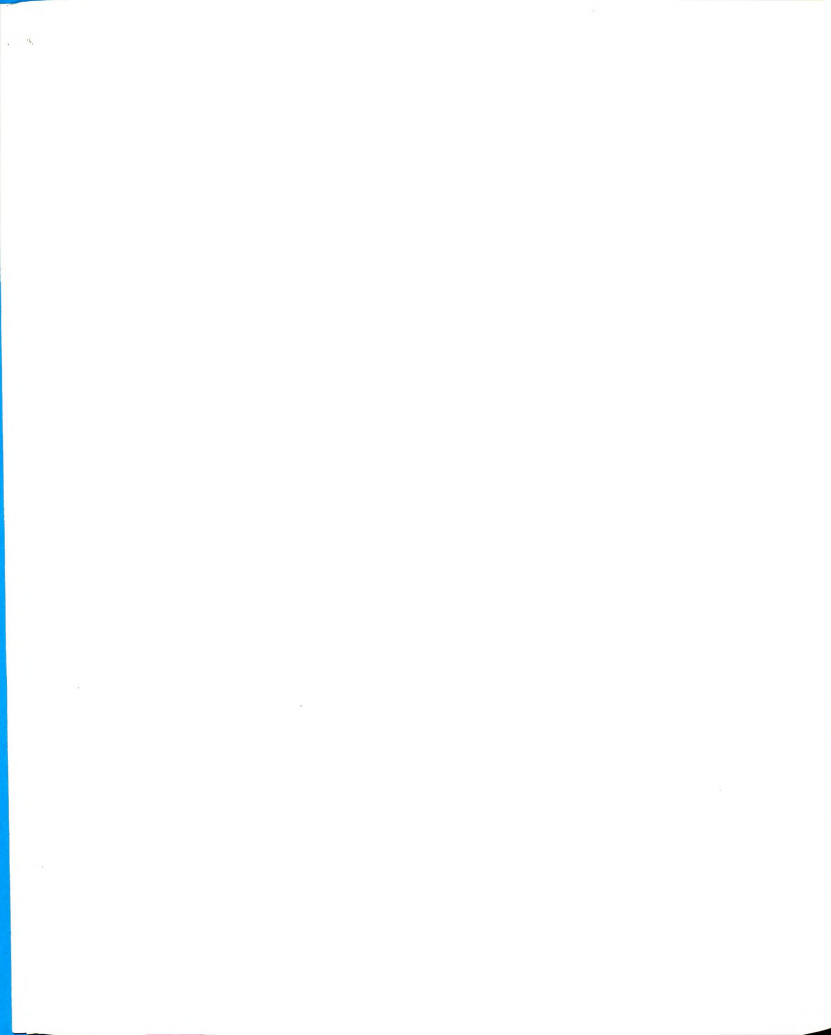
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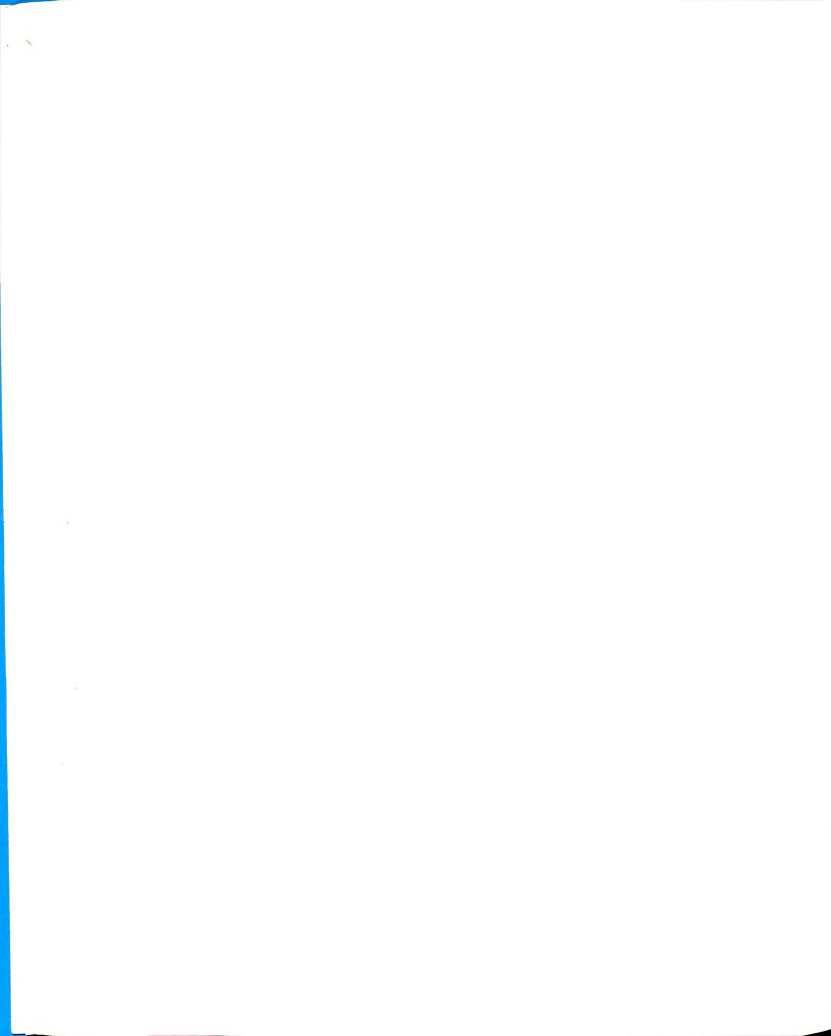


APPENDIX I



OPINIONS ON SOCIAL AND PERSONAL QUESTIONS

We are interested in what the general public thinks and feels about a number of important social and personal questions. The best answer to each statement below is your personal opinion. We have tried to cover many different and opposing points of view; you may find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others, and perhaps uncertain about others; whether you agree or disagree with any statement, you can be sure that many people feel the same as you do.



Mark each statement in the blanks under the statement according to how much you agree or disagree with it. Please mark every statement. Use the following depending on how you feel in each case. Check only one blank.

Example:

I DISAGREE VERY MUCH	I DISAGREE ON THE WHOLE	I DISAGREE A LITTLE	I AGREE A LITTLE	I AGREE ON THE WHOLE	I AGREE VERY MUCH
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In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.

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My blood boils whenever a person stubbornly refuses to admit he's wrong.

3	2	1	1	2	3
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There are two kinds of people in this world: those who are for the truth and those who are against the truth.

3	2	1	1	2	3
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Most people just don't know what's good for them.

3	2	1	1	2	3
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Of all the different philosophies which exist in this world there is probably only one which is correct.

3	2	1	1	2	3
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The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.

3	2	1	1	2	3
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The main thing in life is for a person to want to do something important.

3	2	1	1	2	3
---	---	---	---	---	---

I'd like it if I could find someone who would tell me how to solve my personal problems.

3	2	1	1	2	3
---	---	---	---	---	---

Most of the ideas which get printed nowadays aren't worth the paper they are printed on.

3	2	1	1	2	3
---	---	---	---	---	---

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I DISAGREE VERY MUCH	I DISAGREE ON THE WHOLE	I DISAGREE A LITTLE	I AGREE A LITTLE	I AGREE ON THE WHOLE	I AGREE VERY MUCH
3	2	1	1	2	3

Man on his own is a helpless and miserable creature.

3	2	1	1	2	3
---	---	---	---	---	---

It is only when a person devotes himself to an ideal or cause that life becomes meaningful.

3	2	1	1	2	3
---	---	---	---	---	---

Most people just don't give a "damn" for others.

3	2	1	1	2	3
---	---	---	---	---	---

To compromise with our political opponents is dangerous because it usually leads to the betrayal of our own side.

3	2	1	1	2	3
---	---	---	---	---	---

It is often desirable to reserve judgement about what's going on until one has had a chance to hear the opinions of those one respects.

3	2	1	1	2	3
---	---	---	---	---	---

The present is all too often full of unhappiness. It is only the future that counts.

3	2	1	1	2	3
---	---	---	---	---	---

The United States and Russia have just about nothing in common.

3	2	1	1	2	3
---	---	---	---	---	---

In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.

3	2	1	1	2	3
---	---	---	---	---	---

While I don't like to admit this even to myself, my secret ambition is to become a great man, like Einstein, or Beethoven, or Shakespeare.

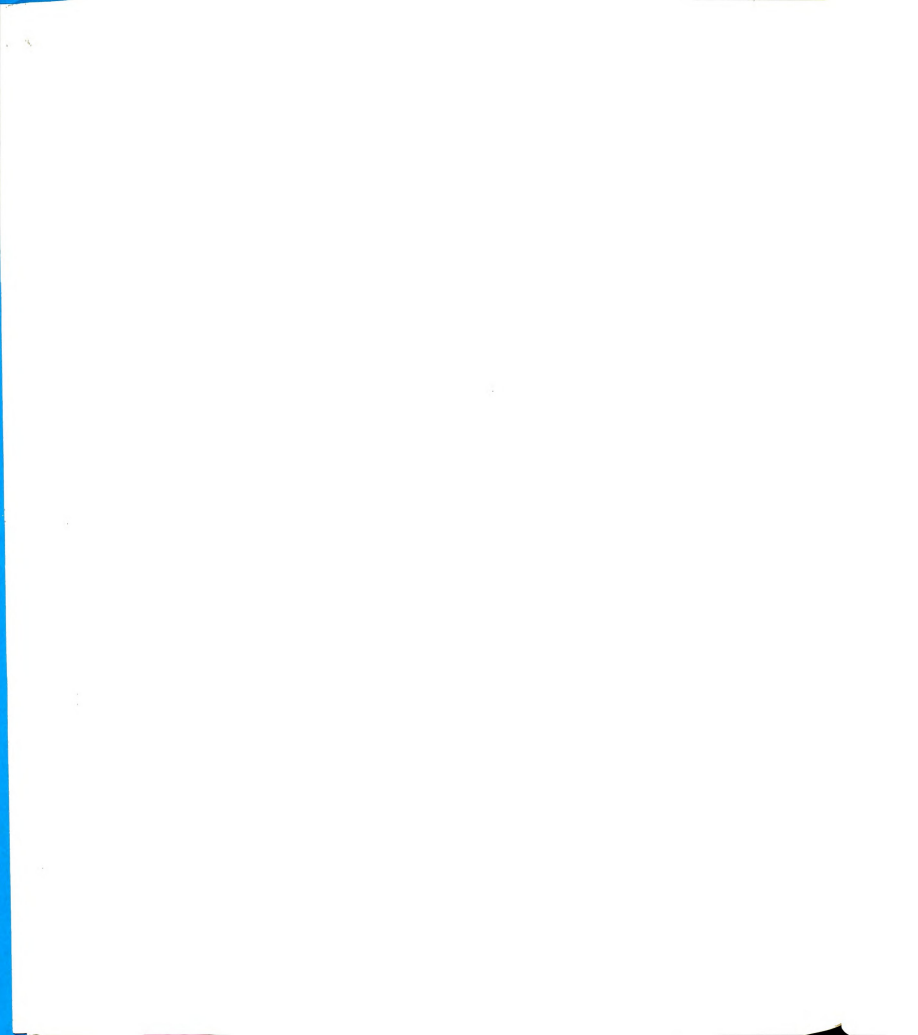
3	2	1	1	2	3
---	---	---	---	---	---

Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary to restrict the freedom of certain political groups.

3	2	1	1	2	3
---	---	---	---	---	---

It is better to be a dead hero than to be a live coward.

3	2	1	1	2	3
---	---	---	---	---	---



APPENDIX II

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R* 4.

R 5.

NEWER EDUCATIONAL MEDIA

During the past twenty years or so, many new teaching aids have been developed. Some of these are sufficiently elaborate to change, or even to replace temporarily, the classroom communication processes which were formerly pretty much limited to students and teachers. Radio, television, motion pictures, slides and filmstrips, and phonograph and tape recorders, certain types of teaching machines and programmed learning methods -- all are examples of what might be termed the "Newer Educational Media." (NEM)

In American education today, there is some controversy concerning these NEM. The following statements represent various points of view on this question.

Please indicate the extent of your agreement or disagreement with each statement. Please don't make efforts to be consistent or to select the "right answer" -- there are none. Simply enter the proper number in the space before each sentence according to the following code:

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

- ____ 1. The widespread use of the NEM will revolutionize the process of instruction as we know it now.
- ____ 2. The possible uses of the NEM are limited only by the imagination of the person directing the usage.
- ____ 3. The wide resources of the NEM stimulate the creative student.
- R* 4. There are no educational frontiers in the NEM -- just new gadgets.
- R 5. Most students see the NEM mainly as entertainment, rather than as education.

Please i
ment wit

R 6.

 7.

 8.

 9.

 10.

R 11

R 12

R 1

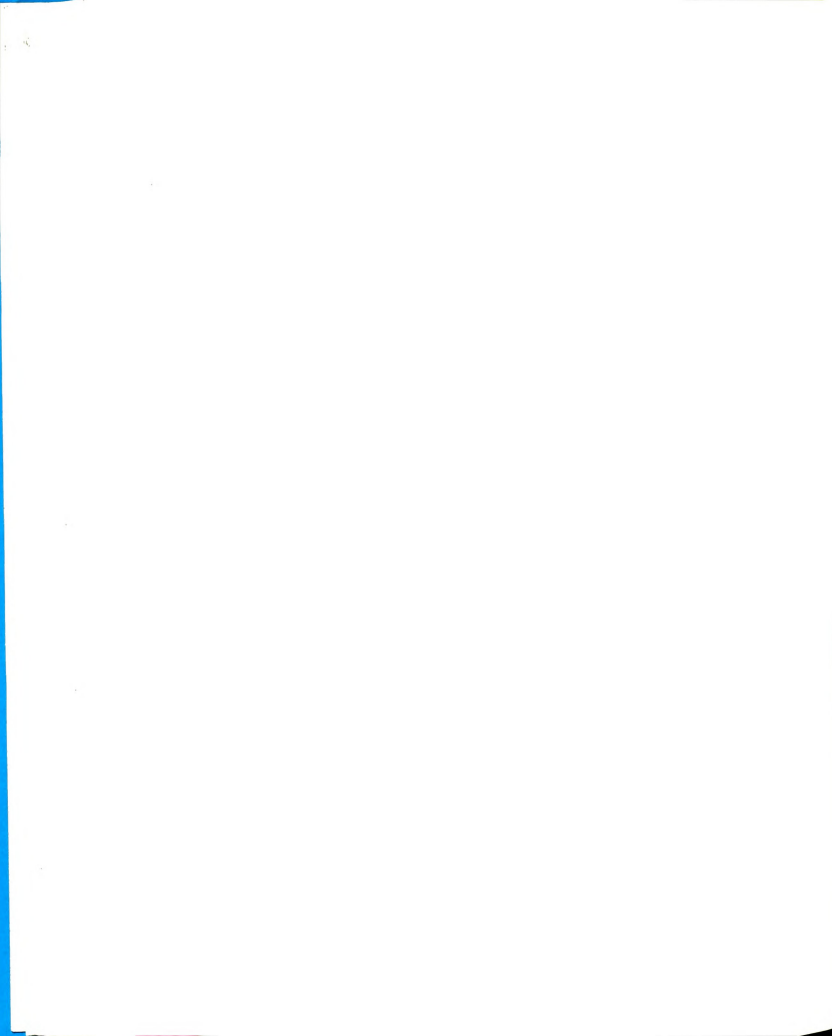
R 1

R 1

Please indicate the extent of your agreement or disagreement with each statement.

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

- R 6. Most teachers lose the gratification of personal accomplishment when the child is taught by machine.
7. Use of the NEM constitutes a major advance in providing for individual differences in the learning needs of students.
8. Much wider usage of the NEM is needed.
9. The vicariousness of learning by NEM aids is not conducive to the most effective learning.
10. If surplus funds exist which could be spent only for supplementary books or for more NEM equipment, the latter should be chosen.
- R 11. Students can learn the basic value of a good education only when taught by conventional methods -- not by the NEM.
- R 12. The problems of getting materials and equipment when you need it, darkening rooms, setting up the equipment, and otherwise disrupting classes tend to counteract the value of most NEM.
- R 13. The "authoritative" presentations of most of the NEM tend to produce an uncritical acceptance on the part of most students.
- R 14. The passive quality of learning by NEM is not conducive to the most effective learning.
- R 15. The proper student attitudes for effective learning are not developed as well by the NEM as by conventional methods of teaching.



Please indicate the extent of your agreement or disagreement with each statement.

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

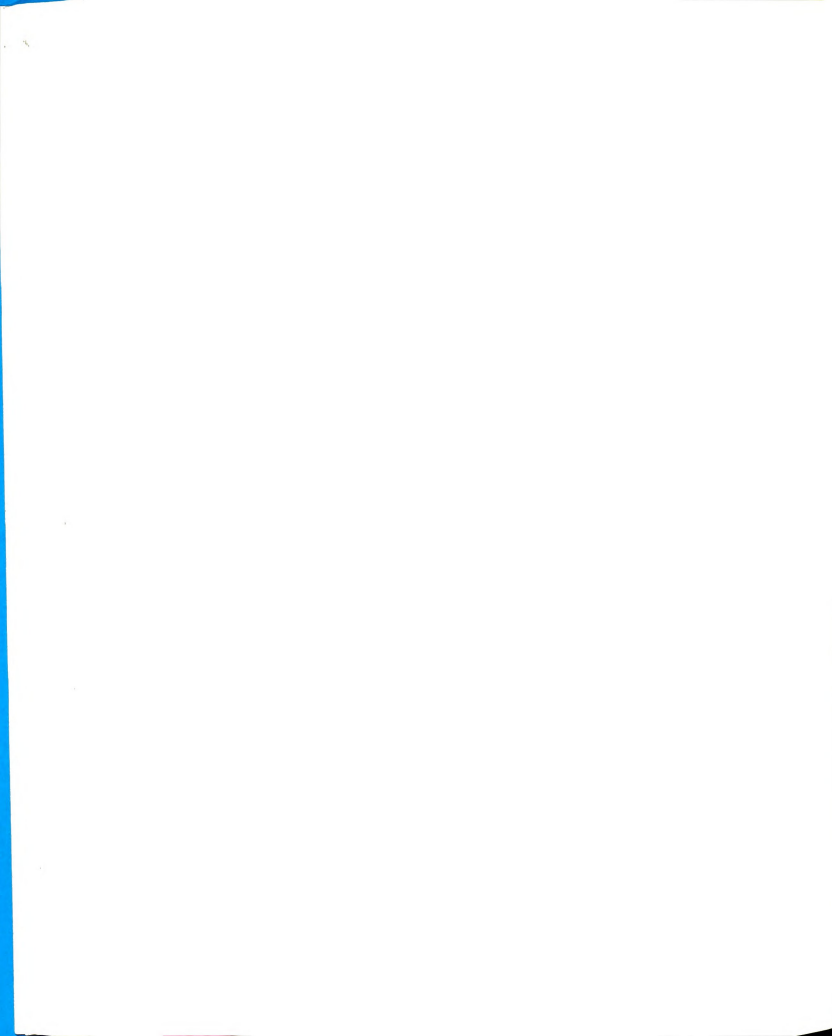
- ___ 16. Only through the NEM can vicarious learning experiences be provided in the classroom.
- R 17. The expense of most of the NEM is out of all proportion to their educational value.
- R 18. The NEM give little opportunity to provide for the individual differences of students.
- R 19. The personal relationship between teacher and student is essential in most learning situations.
- R 20. NEM materials are so specific as to have little adaptability to different teaching requirements or situations.
- R 21. With increased usage of the NEM, the teaching role may be down-graded to clerical work, proctoring, grading, and other simple administrative tasks.
- ___ 22. The development of NEM centers in every school unit should be encouraged and facilitated.
- R 23. The NEM do not suitably provide for the special needs of either slow learners or brighter students.

* Items designated "R" were designed as "negative" items and are reverse scored in determining the subject's attitude.

Table,

Part of

APPENDIX III



APPENDIX III

FORMAT OF INITIAL TELEPHONE CONTACT WITH FACULTY

Hello, my name is DeLayne Hudspeth. I am a doctoral student in the educational media program. Part of my dissertation includes asking randomly picked faculty members about their attitudes toward the Audio-visual Center. I would appreciate about 15 minutes with you to ask some questions about how you feel. Your name will not be used in my dissertation, however. Would it be possible to see you some time next week?

APPENDIX IV

APPENDIX IV

COMPARATIVE DATA FOR USERS AND NON-USERS

Means for Dogmatism Scores, New Educational Media Attitude (NEMA) Scores, Appointment Date, and Age (as of 1965).

	User	Non-User	User and Non-User
Dogmatism	61.83	64.72	63.27
NEMA	58.00	71.50	64.75
Appointment Date	1954	1956	1955
Date of Birth	47	44	45

Correlations Between Users and Non-Users

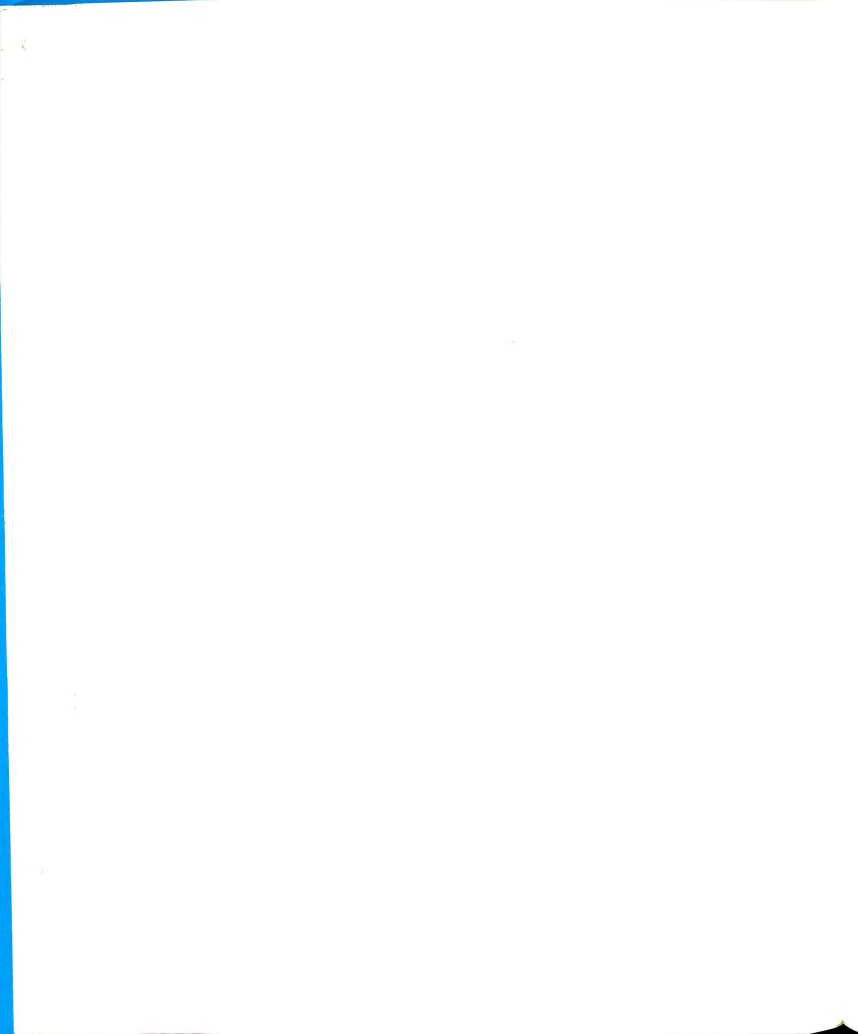
	Dogmatism	NEMA	Appointment Date	Date of Birth
Dogmatism	1.000	.285	.198	.075
NEMA		1.000	.317	.313
Appointment Date			1.000	.649
Date of Birth				1.000

Correlations Within the User Group

	Dogmatism	NEMA	Appointment Date	Date of Birth
Dogmatism	1.000	.476	.253	.480
NEMA		1.000	.272	.272
Appointment Date			1.000	.672
Date of Birth				1.000

Correlations Within the Non-User Group

	Dogmatism	NEMA	Appointment Date	Date of Birth
Dogmatism	1.000	.103	.125	-.372
NEMA		1.000	.315	.229
Appointment Date			1.000	.604
Date of Birth				1.000



1. 1943

2. 1944

3. 1945

4. 1946

5. 1947

6. 1948

APPENDIX V

APPENDIX V

I am a graduate student doing work in the audiovisual area and would like to ask you a number of questions about your perception as to the role of graphics and graphic type materials in the teaching process. Excluding the black board, this would include such things as slides, charts, posters, overhead transparencies, etc. I do not care what your answer is, nor will your name be used in my dissertation. I would like to obtain your honest opinion to the following questions

1. Are you familiar with the graphics department of the audiovisual center? YES NO
2. Have you used graphics in teaching within the last year? YES NO
3. (IF YES) About how many times? _____
4. (IF NO) Are there any particular reasons why you do not use graphics? _____

(GO TO #11)
5. (IF #2 YES) About what percentage of the graphics you used were prepared by the AV Center graphics department? _____%
6. (IF ANY, #5) Were you satisfied with the professional help you received in the graphics department? YES NO
7. (IF NO, #6) Could you explain? _____

8. Did you feel that the charges made by the graphics department were reasonable? YES NO
Why? _____

9. Were you satisfied with the quality of the work?
YES NO
10. (IF NO, #9) What kinds of things were the cause of your dissatisfaction? _____

11. Has the amount of departmental money available to you for graphics been adequate? YES NO
12. (IF NO, #11) What kinds of graphics would you have requested if additional funds had been available?

13. Which course do you teach the most often? _____ # _____
14. What is the range on the number of students which you teach in this course, and what would the average number be? Range _____ to _____. Average # _____.

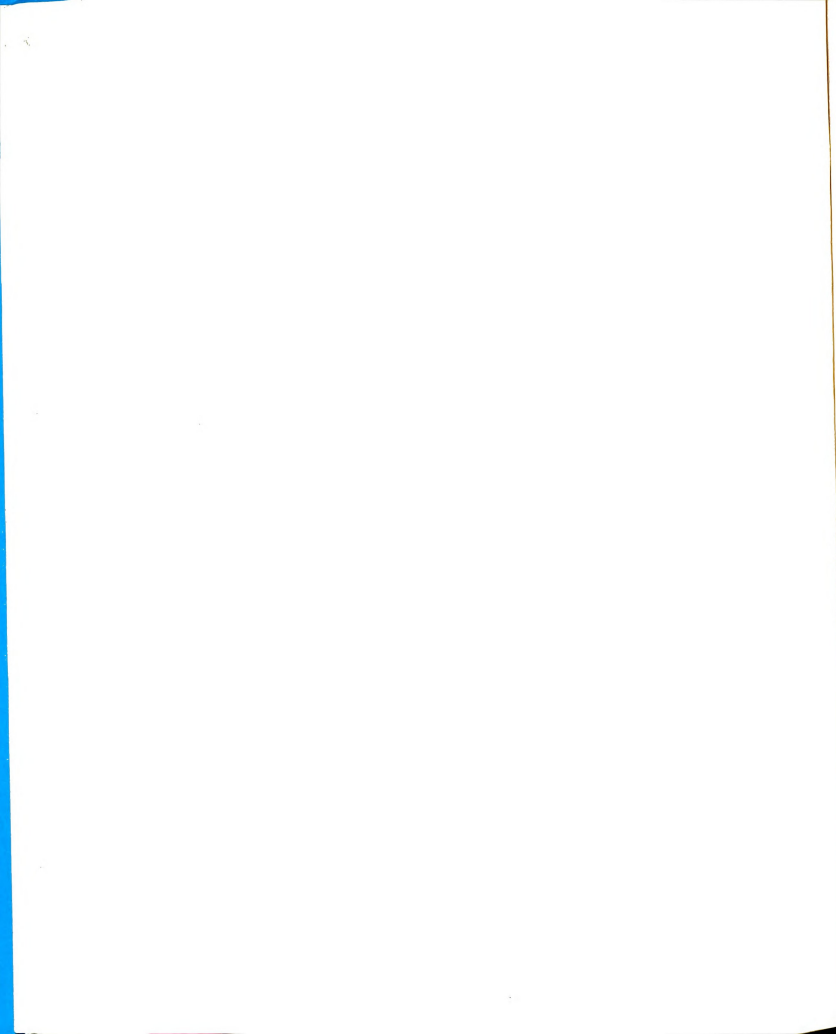
15. I am assuming that you have gone to some professional meetings within the last year. Do you remember if graphics were used in any of the presentations?
YES NO
16. About how many of these trips would you estimate that you have taken in the last year? _____

17. Can you make, or have made, graphic type teaching materials within the department? YES NO
18. (IF YES, #17) What kinds? _____
19. Is there a library of graphic materials available to you within the department? YES NO
20. (IF NO, #19) Would you like to see such a library?
YES NO

Next, I would like to give you two short questionnaires. These will only take about five minutes apiece and you will find the instructions for each one written on the first page.

(GIVE THE FACULTY MEMBER THE NUMBERED NEMA AND DOGMATISM QUESTIONNAIRES)

NOTE: CHECK NUMBERS



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