VanWORMER, William Lee, 1926-
DEVELOPMENT OF A DELIVERY SYSTEM FOR PRODUCING
LOW-COST CUSTOMIZED VISUAL MATERIALS AND
STUDYING BARRIERS TO OPTIMAL USE OF THE SYSTEM
IN DEVELOPING INSTITUTIONS: A QUALITATIVE
ANALYSIS.

The Ohio State University, Ph.D., 1969
Education, theory and practice

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FIELDS OF STUDY

Major Fields:

Studies in Audio-Visual Instruction. Dr. Edgar Dale, Chief Advisor.


Studies in Problems of Higher Education. Dr. Everett J. Kircher, Adviser.
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INTRODUCTION

This study has aimed (1) to develop an invention that could possibly solve valid and identifiable problems that exist in an on-going educational setting, (2) to introduce the invention into a selected target system for possible adoption, and (3) to apply an accepted structured scheme to bring about a desired change within the context of the target system environment. The following chapters have been devoted to a qualitative description and analysis of the project.

This effort is a contextual field study conducted in a consortium setting made up of sixteen cooperating and developing collegiate institutions in the Midwest. The consortium, a recognized agency for change, was used as the vehicle to introduce an invention into local target systems on four participating member institutions.

The need for the study grew from an actual on-going contextual situation in which the writer performs daily. The problems defined were real, valid, and relevant to the setting. The invented solution applied to the target system was specially designed for and made available to the writer for this effort. Procedures designed for application in this work were appropriate for the role in which the writer functioned with the target system. Finally, the programs developed within the target system were initiated, using an accepted model designed to follow the process of change in higher education.
CHAPTER I

THE PROBLEM

Introduction

In a paper entitled "Agenda for Colleges and Universities," former Secretary, John Gardner, listed as a sub-title, "Higher Education in an Innovative Society." He listed seven major problems to be met in order to fulfill the needs of the innovative society. He began with teaching as a central problem to which status has to be restored. Secondly, he stressed the need for undergraduate curricular reform, and it included the requirement for "thorough exploration of the possibilities of new teaching aids and methods." This study is devoted to the second portion of the quotation noted above; namely, the exploration of new teaching aids and methods to bring about an improvement in the quality of education on the campuses of developing institutions.

More specifically, this work is a qualitative study in persuasion. It has been designed to study methods and means by which attitude change can be brought about in order to accomplish a fuller utilization of new media. Basically, this is a study to examine the possibilities of institutionalizing mechanisms for change, utilizing a delivery system designed specifically for this project and one that will provide the ca-

pabilities for a professor to produce customized color visual materials in optimal quantities with a minimum skill level required to produce the materials. The setting for the study is that of a consortium made up of sixteen member institutions. Thirteen are classified as developing institutions and three are considered cooperating institutions. The classifications noted are in accordance with those set forth in the Guidelines for Title III of the Higher Education Act and issued by the U. S. Office of Education. Four of these institutions were selected for this study.

Technical journals and mass media show growing concern for higher education and the need for attention to teaching. For almost a decade, higher education has been considered a first line of defense—for the protection of our country. A typical example appeared in Time magazine (May 6, 1966): "The bets are down: The U.S. is relying more heavily than ever on college education to shape its destiny." This same article, further states, "Undergraduates stare across thirty rows of seats at a listless scholar reading from his own textbook and begrudging the time spent away from his esoteric research."

Certainly, it can be assumed that former Secretary Gardner is encouraging us to provide articulate, lyrical, well-planned teaching and to stimulate the "listless, begrudging scholar" to improve. This writer believes that in the community of scholars, both professors and students learn continually, although often in different ways and at different maturity levels. The needs of both professors and students must be met in the most effective and the most efficient way. The great quantity and diversity of available learning resources make it critical to develop a
well-organized plan for their acquisition, storage, delivery, and up-
keep. In the paragraphs to follow, the writer will assume that the com-
municator is perceived as the institution, administration, or the
decision-making body responsible for curricular changes. He will at-
tempt to let the faculty member serve the role of the vehicle by which
communication will take place. He will attempt to provide an in-service
up-grading of the tools available to the professor in order to enhance
his effectiveness in the communicative process.

Considerable effort will be spent to determine what kinds of
change mechanisms are not centered about a particular person but instead,
evolve from a system by which innovation and change become regenerative
in nature. At times, the reader may feel that the color delivery system
utilized in this study is really a catalyst in an inanimate form. How-
ever, it is hoped that the "wedding" of the institutional change mecha-
nism and the delivery system for visual materials can provide a total
system by which presentations can be enhanced. It is further hoped that
the recipient of the benefits of the up-graded presentation and better
content analysis will be the student.

The Problem--Its Scope and Depth

The aim of this qualitative study is to ascertain whether a de-
ivery system that would enable an instructor to rapidly produce custom-
ized color visual materials in optimal quantities is capable of motiva-
ting greater use of new media on campuses of developing institutions.

As Director for Instructional Media for a consortium of sixteen
developing and cooperating institutions, the writer has had primary re-
sponsibility for the development of programs designed to improve the quality of instruction at member institutions through the more efficient use of instructional media. Techniques used to implement such improvement have ranged from the application of sound communications processes to the utilization of more efficient methodology as technological breakthroughs are accomplished. The approach has been interdisciplinary in nature and has attempted to offer communications research findings as an aid to the decision-making process with regard to curriculum development in the areas of content and audio-visual materials applications.

One example of the attempts made to improve the quality of education within the consortium is the initiation of a wholly unique telephone communications network, designed to provide an impact at the classroom level. The system, made operational in February, 1969, incorporates a total conferencing capability, so that expert faculty members can be shared on other campuses. The system has two-point as well as multi-point capabilities, supplemented by specially modified Victor Electrowriter equipment to provide both a "send and receive" capability for each campus.

Thus far, over five thousand students, faculty members, and administrators have been involved with activities transmitted by this unique road map by wire. Full credit courses, special events, and administrative conferences take place daily and events have been scheduled for the entire academic year.

The writer has served the role of a catalyst for interested per-
sonnel at both the faculty and administrative levels while also serving as a staff extension to each institutional staff on an "on-call" basis. He has tried to focus considerable effort in evaluating the collective audio-visual resources available within the consortium, as well as identifying potential human resources which might be motivated in the direction of innovation and change as a method to improve instruction at their institutions.

During this period of time, he has been called upon to administer, coordinate, and support the provisions of the programs funded under Title III, Section 304 of Public Law 89-329 (Program for Strengthening Developing Institutions). Specifically, these have included a Cooperative Audio-Visual Resources Program and an Audio-Visual Pilot Program designed to develop new presentation methods. He has also served the consortium as a consultant on inter-institutional communications systems and on other related projects as required and as time was available.

Statement and Reasons for the Problem

Thus, this project has been a logical outgrowth of an on-going program that the writer believes lies at the very heart of greater utilization of instructional media implementation. Each developing institution, whether a member of the consortium or not, is constantly faced with the realization that there are deficiencies in available resources to accomplish its goals. Each institution in this consortium did recognize that its existence depends on its ability to provide a quality educational program for its students.

In 1966, the Academic Deans of the consortium faced their indi-
vidual problems with regard to improving instruction through more efficient and effective use of audio-visual materials and new media. This collective concern was voiced in the request for and subsequent funding of the two projects mentioned earlier. The consortium members have, as a result of The Cooperative Audio-Visual Resources Program, been able to analyze their specific strengths and weaknesses with regard to the use of the new technologies in instruction. As of this point in time, they have been able to determine what the collective physical environment looks like as a result of the inventory of the quality, quantity, and types of audio-visual equipment. In addition, they have been able to identify the existing human resources capable of conducting and utilizing advanced technological innovations in the improvement of instruction.

The project here described is a direct outgrowth of the Cooperative Audio-Visual Resources Program presently funded under Title III. Initial effort under the referenced program noted above has disclosed that some instructors in developing institutions do not use existing audio-visual materials, nor do they plan to take advantage of new media technology because:

1. They do not have access to the equipment.
2. They do not know how to use the equipment.
3. They do not have production capabilities by which up-graded or customized course-content can be produced at a low cost and still be compatible with existing facilities.
4. They assume that the unaided lecture alone, can
convey the total information required in the learning situation.

Project Goals and Sub-Goals

The project here described tries to develop a delivery system to provide rapidly produced immediate visuals in full controllable color at a low cost, and requiring minimal skill level of the user. The writer believes that a system that helps eliminate the problems noted above could motivate instructors to use visual materials much more readily than they now do. Thus, by developing customized visual materials for a specific block of learning, appropriate change mechanisms can be built into the institutional system that could have an impact at the classroom level. This premise supports the major goal for this project; however, certain related goals will be examined and these are listed below. The writer will attempt:

1. to isolate specific sources of faculty resistance in using audio-visual materials and the reasons for this resistance.

2. to determine how much the use of these materials might be increased as a result of participation of selected faculty members in evaluating and preparing college level audio-visual materials for pilot programs.

3. to determine whether these pilot courses prepared under workshop conditions would help remove barriers to greater use of audio-visual materials by peer groups.
4. to determine the degree of frequency in using the system, as influenced by such factors that influence usage such as teacher time, budget allotment, compatibility to subject matter, and compatibility with existing distribution materials.

5. to determine what kinds of change mechanisms must be institutionalized to provide for continuing change.

In order to better understand the unique setting for this study, I will describe the history, philosophy, goals, and programs of the consortium in which the project took place. The following paragraphs will set forth these elements as background information.

The Consortium—A Description

The consortium setting for this study is composed of sixteen member institutions serving higher education needs in the midwest. Currently, three public institutions and thirteen private institutions of higher education comprise its membership. Founded in 1962, it was designed to provide systematic communications, cooperative programming, long-range planning, and a complete and accurate picture of higher educational resources in the greater Kansas City area. It is currently providing services in forty-three programs for its member institutions.

Since the consortium movement in higher education appears to be a growing trend, perhaps it is well to establish certain basic information with regard to growth, definition, and implications for this trend. The descriptive materials may seem extensive, but the writer believes that the setting for this work has been important in gaining the kind of
program endorsement that must be given before initiating innovative activities.

The development of consortia in higher education in the early sixties reflects a need recognized by the colleges and universities to adapt themselves to rapid social and economic changes. As elsewhere, this timely and helpful trend was made possible by earlier experiences in cooperative programs related to athletics or fund-raising. Effective relationships among educational leaders developed out of these activities.

In what might be referred to as the first wave in the consortia movement, educational institutions, participating in early cooperative efforts, began to plan and develop new inter-institutional projects one by one. Each project was tested for the impact it might have on the participating campuses. Such activities, however, influenced decisions only slightly on what remained essentially sovereign or independent campuses. As the influence of consortia grew, they began to alter the pace of change and to influence its direction. As this first wave of cooperation begins to reach its crest, individual programs tend to be linked, and these programs spawn second and third generation levels of activity. Well before this crest is reached, however, there begins to appear among the participating institutions a tide of marked awareness that cooperation is not an end in itself, nor does it stand apart from the central area of campus dynamics.

A second wave in consortium development may very well result in intermediate joint efforts, carried out by a central administration, to

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furnish part or all of the support services of a group of institutions. This development may not include all of the consortium membership in a particular service, nor include a given minimum number of services. Fore-runners of this second wave are pilot projects such as National Defense Student Loan Collection Programs, joint purchasing of insurance, and the like.

A third, and more distant wave of development, may be the eventual merger of several colleges and universities into a larger, more efficient, and more viable corporate entity. Such a merger would be developed around particular services and would probably mean that the consortium would continue its role by coordinating larger units. There would, no doubt, remain a highly decentralized campus and educational program orientation.

As the writer views this process in the light of current experience, this direction appears to be the most promising of the achievement of long term survival and up-grading of the quality of instruction in the region.

A. Strengthening a Recognized Trend

In the few brief years since its founding, the consortium has achieved involvement of all institutions of higher education within the watershed of its membership. This watershed seems to have developed in a natural way to include those portions of western Missouri and eastern Kansas whose cultural and educational confluence is the urban center of Kansas City.

The consortium developed close ties with elementary and secon-
dary education, major university systems in Missouri and Kansas, and with educational agencies in the Kansas City area. These ties have brought forth joint activities such as the Kansas City Metropolitan Area Talent Search. Recently, state-wide studies in Missouri have been completed and others are under way in Kansas. Recommendations of these studies encourage regional development through joint institutional effort. On this basis, the consortium, working with federal agencies such as the Education Committee of the Federal Executive Board in Kansas City, has begun to move toward a Kansas City region-wide approach to higher education.

A major step in this direction has just begun. Recently, Kansas City, as a bi-state community, recognized the need to strengthen higher education. If successful, the outcome could result in the evolvement of Kansas City into a major center and leadership role in higher education in the nation. Such a center would not result from an isolated island of strength within a given geographical area, nor from sporadic or tentative support, but rather from the systematic development of public and private higher educational resources. This could, in turn, offer a wide range of services to meet the many diversified needs of a dynamic, expanding metropolitan community.

Expectations of this particular outcome are supported by such activities as the Women's Chamber of Commerce support for the central film and library collections, local foundation support for faculty and institutional development on a joint basis, current ties with local governmental agencies through the Federal Executive Board, recent community-wide studies completed by the Metropolitan Junior College. Other examples are
the Metropolitan Planning Commission, the health services on Hospital Hill and at the Kansas University Medical Center, the Junior College in Johnson County, and the Partners for Educational Progress Conference.

These efforts, if successful, could provide a minimum viable economic base for each campus, and upon this joint project or program support, could make possible the achievement of a significant up-grading in the quality of the program on each campus.

The success of this development will likely focus upon the ability of joint projects to produce a multiplier effect. Since such serendipitous effects have been noted during the past several years of the consortium's operation, there is ample evidence to sustain this expectation. The self-generation of additional projects and follow-through programs as a result of the successful completion of initial projects is the key to consortium growth and success.

B. The Consortium Philosophy

A consortium must develop goals with accompanying standards in order to guide its development successfully. These goals and standards thus serve as criteria for the development of priorities among promising new projects. The consortium used for this study has developed the following goals:

1. As a primary goal the projects must measurably improve the quality of the learning experience of students on member campuses. Supportive of this primary goal is a secondary goal of improving the quality of institutional administration so as to
enhance the likelihood that the quality of learning can be improved.

2. Projects must involve desirable activities which individual institutions are incapable of carrying out.

3. Results of the project must have the potential of providing a significant impact on the participating campuses in a way that relates to the institutions' primary goals.

4. Efforts and funds directed toward the project must have a reasonable relationship to the expected results. Such a consideration takes into account a sufficient level of funding, staff expertise, and physical resources. There must be a compensating balance of improvement beyond the interference with normal on-going campus activities. Administrative coordination must be sufficient to permit the smooth and efficient development of the program.

5. Projects should be organized to provide maximum opportunities for adequate surveillance by participating institutions. Involvement in the planning, conducting, and administering of such projects is essential for all participating institutions. Such surveillance is usually effected through a central office and standardized committee consultation procedures.
C. Role of Cooperating Institutions

From the inception of the consortium, members classified under Title III as cooperating institutions and members designated as developing institutions have been intimately and equally involved in all deliberations. This experience goes beyond what might be termed a more primitive relationship in which cooperating institutions formally contract to assist developing institutions in a particular phase of a project. Rather, an entire region pools its best talent for such consideration. The most able representatives, regardless of institutional affiliation, provide the greater assistance, but a mutually agreeable conclusion is achieved without a declaration of or thought about who is big brother and who is little brother.

In this way, the three designated cooperating institutions become an integral part of each of the projects and are able to assist at all stages of planning and implementation. However, regarding the funds to be identified either with an institution or a staff member for other than consultative purposes, it is understood that only a developing institution or member of its staff can be a direct or primary beneficiary. It should be obvious that the communication systems that link cooperating institutions with developing institutions meet this requirement. This point is worth emphasis, especially since the Board of Directors believes this to be an advanced state of development of cooperating-developing institutional relations. This approach has been carried out with a high degree of success in projects funded under Title III (PL 89-329) during fiscal year 1968.
D. Consortium Activities

The following kinds of activities, assigned to the Central Office, reflect what experience suggests are the activities which a consortium can do best:

1. Conduct in-service training programs for optimum identification of role responsibilities. Consultants, region-wide studies, special reports, and peer discussions are used to support this activity.

2. Effect constructive change in existing institutional programs. Active peer pressure which develops out of joint consultation directed towards problem solving activities appears to be an important lever to achieve change. Perhaps this is because it lifts some of the difficult problems out of the matrix of local campus factors. In this way, a stalemate which has blocked progress can be broken.

3. Provide perspective for problem diagnosis. Here again consultants, region-wide conferences with Central Office expertise, and peer discussion provide perspective and incentive.

4. Activate long-range projection of current efforts. Institutions can no longer survive on a year-to-year basis. Major problems and their solutions require systematic consideration and long-range projection. These patterns of problem resolution
are encouraged. Council activities or leadership provided by Council staff can produce beneficial effects in these circumstances.

5. Increase economy and efficiency by joint participation. There is great advantage in dispersing costs over a greater number of institutions and in focusing upon the central issues in a given activity, whether the activity be student health insurance or arranging for visiting lecturers.

6. Elevate and stimulate the creative resources of member campuses. Through joint efforts, solutions to old problems maximize the creative contributions preciously limited to a small campus focus. This has a particular self-generating quality as projects mature and take new and more effective forms. As with any pioneering venture, the harnessing of this creative contribution is an important part of Council development.

7. Increase national and international awareness of approaches to problems in higher education.

The net effect of each project tends to carry member institutions toward the so-called mainstream of higher education. Isolated or provincial approaches to problem resolution are replaced by a systematic review of educational experiences discovered outside the consortium, and discussion takes on a multi-campus approach as the project develops.
The Need for the Study

There appear to be too many people speaking, writing, and thinking about education today as if it had just begun on the date that Admiral Rickover discovered the American educational system. He seems to have come to his criticism of the system by analyzing the reasons for the inadequacy of high school and college students in the fields of mathematics and the natural sciences. He then moved to indict the entire system for its reliance on the educational ideas of John Dewey. In place of progressive ideas, he urged the sort of elitism of the European system, with a standard "hard" curriculum that would tend to sort out the talented from the untalented and keep everyone alert and on his toes.

These arguments seem plausible until we look at real students in real classrooms in real cities. It appears too, that these arguments benefited from the help of the Russians, who by putting up space satellites before we did, showed that their educational system might be one to be admired and emulated.

Publication of these criticisms seemed to establish in the public mind, the notion that education began in 1958 when we witnessed a national urge to catch up with the Russians. This fact led many to denounce the present American system on the grounds that it was inadequate to meet the challenge of a modern age.

However wild or illogical the premise may be that success in heavy rocketry is dependent solely on education, the argument seems to have been easily accepted and acted upon. It was at this point that The National Defense Education Act was passed by a Congress that sprang into
action after seeming to have been unconscious of the needs of education for many years. The conception that education was linked as an instrument of national policy to our national security seemed to be accepted by the majority of the American public and specifically by most of those in the academic community.

Regardless of the motivational reasons behind federal support to education, American education today appears to be blessed with a more acutely aware general public and a sense of urgency within the government to aid and improve our total system. Certainly, innovation and change have become major concerns of educators today. As noted by O'Keefe, the provisions of the Elementary and Secondary Education Act of 1965 have been equally as important to higher education.

With billions of dollars being poured into our educational subculture, there are those within the responsible funding agencies as well as those in the academic community asking, "What is actually happening in the classroom?" and, as O'Keefe asked, "How well does it work?"

In a paper delivered by R. Louis Bright, Associate Commissioner for Research, United States Office of Education, he talked about the

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4 Ibid.

need "...to fill the gap between research and practice." He further declared that it was his conviction that research and development in education and the change process are two very different functions or processes which must, however, be related intimately, sensitively, and integrally to one another. It would seem that Dr. Bright is telling us that the research and development process produces the substance of improvement. It yields the knowledge about the learning process and the social setting for learning and education, and it encourages the refinement of objectives as well as the development of materials and instructional processes which incorporate that knowledge into improved practices.

It is, therefore, the aim of this study to examine a method for the implementation of innovation and change. It will analyze the development of a new practice, materials, and processes based on the knowledge created in other kinds of studies. Where applicable documentation is not available, the writer will try to provide a new basis for his rationale that might be tested in subsequent studies. This will involve identification of the specific improvement desired and a systematic engineering of that improvement using related information from basic research that is relevant.

In order to develop a methodology for this study, we must recognize that a basic question being asked by proposal evaluating teams at both governmental funding agencies and at private foundations is "How will you know when you get there?" or "How will you evaluate change in a field situation?".
The need for this evaluative requirement can be found in a report made to USOE by Dr. Francis S. Chase as part of the evaluation of the Regional Educational Laboratories, funded under Title IV of ESEA. In the report one finds considerable recognition of the merits of the many regional projects undertaken. However, the greatest concern seemed to be the lack of incorporation of evaluative techniques for each project at the classroom level. Further evidence of this requirement can be discovered by noting the number of research design and evaluation personnel that have been added to the professional staffs of these laboratories. Nolan Estes, Director for Title III projects of ESEA, was quite specific in noting that, "Two areas of weakness in proposals have been provisions for evaluation and dissemination." 

Perhaps the reason for inadequate evaluative techniques for innovative projects can be found in the fact that educational research has attempted to follow the physical sciences in developing techniques centered about tightly controlled laboratory situations. The investigator can manipulate, isolate, or ignore certain variables as he studies the effect of change.

According to A. S. Barr, studies of this type have been classi-

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fied as **action research**. There appears to be a profusion of studies of this nature applied to television, and multi-media approaches to the gross effects of teaching procedures.

Considerable effort will be devoted to the present status of media research in subsequent chapters. However, it is well to note here one of the main concerns that faced the writer in developing a scheme by which an observational technique might be structured to provide an evaluative measurement of change in an on-going situation. If we can assume that action research is most favorably applied in controlled laboratory situations, we can also assume that we cannot ignore the multi-variate complexities that exist in the field where the school situation cannot be manipulated so as to provide for the isolation of selected variables through pre-determined methods.

Certainly, the aim in this work was not to set rigid controls for use of the invention or establish the typical control and experimental groupings associated with traditional educational research approaches. Instead the aim was to determine how programs function without direct manipulation on the part of the investigator. This work is concerned with the acceptance and utilization of a delivery system for color visual materials by the individual professor, the institution, and the administrative hierarchy. Of equal concern are the deterrents to change, the limiting factors related to the invention and the change mechanism, and methods by which the new approach might be revised or adapted to other situations.
The Need for an Evaluative Methodology

We are concerned here with an actual situation. It is, therefore, important and necessary to examine innovation within the context of that actual situation. We are interested in how an invention works within the exposure framework.

To talk about the change process in global terms is frustrating and fruitless. Many articles have been published bemoaning the fact that research reports have been gathering dust in libraries instead of furnishing an impact at the classroom level. It would appear that such disuse might be appropriate since much research has little to say to the practitioner. Moreover, why should it? If, as noted earlier, the research and development activity is different from the change process, this would be a logical thing to happen. Research is conducted to advance knowledge and may or may not influence practice. It should be evaluated on its own terms such as internal or external validity. But researchers are being criticized for not addressing themselves to "real problems" while practitioners seem to build guilt feelings because they do not use research in decision making.

This dilemma offers both positive and negative impact on personnel working in the field and seems to be illustrated by Miles who noted that Richard Suchman along with his "discovery method," was considered "a Messiah" by some researchers and conversely labeled a curriculum de-

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veloper by the curriculum people.

He goes on to illustrate that something or someone is missing in our thinking by attempting to specify divergent research roles (e.g., the engineer, the field tester, the quality control man, or the county agent). This same effort was noted by Wiles at the ASCD Seminar on Strategies for Curriculum Change, when he allocated these tasks to agencies outside of the institution. At the same meeting Lippitt talked about the "gap between new knowledge and educational engineering." There seems to be a call for an educational engineer, a translator, or a middle man to function between the creator of an invention (the researcher) and the change agent (a group or institution).

It is toward this same area that the writer is directing the role of the consortium and the observer as they attempt to structure a method to evaluate change in an actual field situation. If it is true that we need an educational engineer or group to assume the role of a catalyst, what do they need in order to structure an instrument to evaluate the relationship of the various processes and functions in the change process?

It would seem appropriate to answer the question by applying an instrumentation scheme that is well recognized as being valid and accept-


ed by researchers and practitioners alike. This is not the case. There
are no valid or accepted evaluative techniques, so far as can be deter-
mined, that have been applied to contextual studies. Again, it must be
emphasized that we are not interested in the many possibilities as to
how an invention could work. Instead, we must evaluate the process in
terms of what actually happened in the total context of the learning en-
vironment.

Several techniques have been developed to attempt to evaluate
field situations and educators have devised several observational modes
for studying classroom situations. Included are depth interviewing,
surveys, general data gathering, and, of course, personal observations.
No one of these alone can furnish the desired data to examine the total
environment.

It is, therefore, necessary to evolve a more appropriate method
that not only incorporates all of the techniques, but has the added di-
mension of a model or checklist that will provide a way of noting the
milestone events as they occur on a planned continuum.

Application of an Evaluative Scheme

The bulk of change research in education conducted over a twenty-
five year period by Paul R. Mort, has been concentrated on a single phase
of the change process, e.g., the actual adoption of an invention by a
school district with little reference to the role of the change agents.
It seems that even where this work examines an institutional change role
(e.g., state, federal, and private agencies), the data are nearly impos-
sible to use since he applied what Miles refers to as "common sense" cat-
egories" that appear to be unrelated to change research under way in other fields.12

It might be pointed out here, that a classification of the elements in the change process is only one vantage point from which the question of change roles can be viewed. Chin has established a five category classification of change that includes substitution, alteration, perturbation and variation, restructuring, and value orientation change.13

It is highly likely that change roles could be altered drastically in relation to inventions requiring changes of these various types. Certainly, the parameters of this study would indicate this to be the case from both the standpoint of the delivery system for color visuals (the invention) and the change mechanism (the institution). Substitution, for example, could apply to the present system for obtaining color visuals and also to the institutional organization that makes the visuals possible by whatever means are available.

There are many models that could furnish a rationale for a study such as this work, but none seems to offer the critical path provided in the Guba-Clark model as developed for a paper delivered at a Seminar on Innovation in Planning School Curricula in October of 1965.

12Miles, Matthew, "Barriers to Change in Public Schools," Change Processes in Public Schools (Eugene, Oregon: The Center for the Advanced Study of Educational Administration, University of Oregon, 1965).

Before proceeding, there are certain terms which have been used and will be used frequently throughout this work and for which the following definitions are offered. The writer will employ the terms change agent and innovator interchangeably and will mean, "an individual... consciously playing the role of an initiator with respect to an [invention] so that [the invention] may be accepted by another individual, or in an organization or group..."\textsuperscript{14} When referring to a group or institution playing the role of the initiator, the writer will use the designation—change mechanism. The terms target system or adopter will be used to identify, "an individual, group, or institution on which the innovator is working to seek acceptance of an [invention]..."\textsuperscript{15} The term innovation will refer to the process of change and the term invention will mean "(1) an idea or practice which departs from those generally prevailing among an aggregate of people who may be regarded as targets of change directed effort; or (2) a change in technology (a material object with definitions of its use)."\textsuperscript{16}

If the terminology noted can be agreed upon, let us turn to a discussion of the model used to evaluate the change process as we try to determine the movement of an invention (the color delivery system) designed to influence a target system (the professor) using the consortium as the change mechanism.


\textsuperscript{15}\ibid.

\textsuperscript{16}\ibid.
The Evaluative Schemes—An Overview

Thus far, we have been able to establish the purpose of the study, set the environment for the experiment, and establish a definition of terms that will be used throughout subsequent chapters of this work.

To develop a strategy for evaluation of the field study aspect of this project, it was necessary to select a model that would be structured so that an innovator could chart the dissemination of a "process" as well as a "product." A further requirement was that it ought to be based on a social process in order to be applicable to a typical learning situation. The Guba-Clark model for effecting change in education was chosen because it fit these requirements and because the U.S. Office of Education had chosen to refer to it in response to similar methodological questions posed by regional educational laboratories, funded under the Elementary and Secondary Education Act of 1965. The model used in this study was distributed by Title IV advisers on ESEA programs in 1966 while the writer was associated with the Mid-Continent Regional Educational Laboratory. This choice afforded an excellent opportunity to field test, not only an invention designed to effect change but also provided a program to field test the validity and reliability of an accepted theoretical model.

Referring to Figure 1, we can recognize that the model appears to have as its underlying premise, the notion that social process fields must have a wide range of processes or functions which must take place in developing and integrating new found knowledge into effective practice. The four major categories of research, development, diffusion, and adop-
tion seem to provide a logical continuum and clearly places basic research and applied research in a perspective that becomes manageable.

The second advantage lies in the fact that objectives or goals can be stated discretely at each phase or stage so that appropriate criteria can be established to evaluate or analyze each step in terms of the "product" and the "process."

The Model for Change—An Analysis

A. The Research Phase

An observer will be quick to note that this is the only category that has not been divided into steps or stages. Perhaps it is just as well because it has little relevance to the field study applications to follow. If we can still subscribe to the earlier statement that research has a single objective, "to advance knowledge," we can project the thought that research provides the basis for invention noted earlier by Dr. Bright.17

This study does not intend to test the internal validity of the basic research that went into the development of the invention (the color delivery system) used here. Nor will we test the external validity of the basic research—the extent to which the findings are made generalizable. Instead, we will, in describing the reasons for the system and its components, place it in the next phase of the model—development.

B. The Development Phase

This phase is divided into two stages—\textit{invention} and design.

\textsuperscript{17}Bright, May 16, 1967.
FIGURE 1
A CLASSIFICATION SCHEMA OF PROCESSES RELATED TO AND NECESSARY FOR CHANGE IN EDUCATION

<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>DEVELOPMENT</th>
<th>DIFFUSION</th>
<th>ADOPTION</th>
<th>INSTALLATION</th>
<th>INSTITUTIONALIZATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO ADVANCE</td>
<td>TO ORDER AND</td>
<td>TO AFFORD AN</td>
<td>TO BUILD</td>
<td>TO FIT THE</td>
<td></td>
</tr>
<tr>
<td>KNOWLEDGE</td>
<td>THE COMPONENTS</td>
<td>OPPORTUNITY TO EXAMINE</td>
<td>FAMILIARITY WITH</td>
<td>THE CHARACTERISTICS</td>
<td></td>
</tr>
<tr>
<td>TO FORMULATE A</td>
<td>OF THE INVENTED</td>
<td>AND ASSESS OPERATING</td>
<td>THE INVENTION AND</td>
<td>OF THE INVENTION</td>
<td></td>
</tr>
<tr>
<td>NEW SOLUTION</td>
<td>SOLUTION; TO CONSTRUCT AN</td>
<td>QUALITIES OF THE</td>
<td>PROVIDE A BASIS FOR</td>
<td>TO THE CHARACTERISTICS</td>
<td></td>
</tr>
<tr>
<td>TO AN OPERATING</td>
<td>INNOVATION PACKAGE</td>
<td>INVENTION, I.E., TO</td>
<td>ASSESSING THE QUALITY,</td>
<td>OF THE ADOPTING</td>
<td></td>
</tr>
<tr>
<td>PROBLEM OR TO</td>
<td>FOR INSTITUTIONAL</td>
<td>BUILD CONVICTION</td>
<td>VALUE, FIT, AND UTILITY</td>
<td>INSTITUTION, I.E., TO</td>
<td></td>
</tr>
<tr>
<td>A CLASS OF</td>
<td>USE, I.E., TO</td>
<td></td>
<td>OF THE INVENTION IN</td>
<td>OPERATIONALIZE</td>
<td></td>
</tr>
<tr>
<td>OPERATING</td>
<td>ENGINEER</td>
<td></td>
<td>PARTICULAR INSTITUTION,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROBLEMS, I.E.,</td>
<td></td>
<td></td>
<td>I.E., TO TEST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TO INNOVATE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>INVENTION</th>
<th>DESIGN</th>
<th>DISSEMINATION</th>
<th>DEMONSTRATION</th>
<th>TRIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>VALIDITY</td>
<td>FACED VALIDITY</td>
<td>INTELLIGIBILITY</td>
<td>CREDIBILITY</td>
<td>ADAPTABILITY</td>
<td>EFFECTIVENESS</td>
</tr>
<tr>
<td>(INTERNAL AND</td>
<td>(APPROPRIATENESS)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>EXTERNAL)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>---</td>
<td>ESTIMATED VIABILITY</td>
<td>FIDELITY</td>
<td>CONVENIENCE</td>
<td>FEASIBILITY</td>
<td>EFFICIENCY</td>
</tr>
<tr>
<td>---</td>
<td>GENERALIZABILITY</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>---</td>
<td>PERFORMANCE</td>
<td>PERVERSIVENESS</td>
<td>EVIDENTIAL ASSESSMENT</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>IMPACT</td>
<td>IMPACT (EXTENT TO</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>RELATIVE</td>
<td>WHICH IT AFFECTS KEY</td>
<td></td>
<td></td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>CONTRIBUTION</td>
<td>TARGETS)</td>
<td></td>
<td></td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

| RELATION TO     | PRODUCES             | ENGINEERS AND            | INFORMS ABOUT THE     | BUILDS CONVICTION    | TRIES OUT THE       |
| CHANGE          | THE INVENTION        | PACKAGES THE INVENTION   | INVENTION             | ABOUT THE INVENTION  | INVENTION IN THE    |
|                 |                     |                         |                       |                      | CONTEXT OF A        |
|                 |                     |                         |                       |                      | PARTICULAR SITUATION|
|                 |                     |                         |                       |                      |                     |
|                 |                     |                         |                       |                      |                     |
|                 |                     |                         |                       |                      |                     |
|                 |                     |                         |                       |                      |                     |

Guba and Clark have defined invention as the formulation of a new solution to an operating problem or a class of operating problems. It is at this point that the writer, as part of the change mechanism, began to assess the problems recognized on page 6 of this chapter. He tried to determine whether or not the proposed solution noted on page 7 had face validity, one of the criteria required of this stage. Certainly, if the same professors lack the knowledge and facilities to make better use of instructional media for the reasons stated, then the proposed solution has face validity.

To meet the second criterion of viability, there must be an assessment as to whether the solution is worthwhile pursuing in terms of potential significance to the developing institutions or the target system involved. First estimates obtained of the breadth and depth of the potential impact on the target system indicated that it was viable. Although these are probably gross criteria, the investigator assumed that it would be better to err on the side of permissiveness at the invention stage than to eliminate a possible solution because it could not be immediately proven to be valid and viable. With this decision made, we are provided with the avenue toward the next stage of this phase of the model—namely designing the invention to make it appropriate for institutional use.

As implied by the model, invention alone would be unusable unless ordered or systematized appropriately so that the invented solution can be packaged for institutional use. It is here that decisions had to be made about the invention from the standpoint of both the product and the process for producing the desired change. In effect, the engineering pro-
cess noted earlier on page 24 becomes most crucial to the total process. It is here that the invention becomes a transportable package designed for application and ready for the third phase of the process—diffusion.

C. The Diffusion Phase

The first stage of the diffusion phase is dissemination and would be concerned with creating a widespread awareness of the existence and the general nature of the invention within the target system. In practice, dissemination serves two purposes, (1) it is the process by which an invention or innovation can be shared and (2) it is the process of spreading inventions and innovations into the institutional setting. Diffusion then, becomes the process by which innovation spreads.

The criteria which can be applied to dissemination seem to be essentially communications criteria; (1) pervasiveness, the extent to which the information about the invention has reached the target system; (2) intelligibility, the extent to which that information was transmitted in undistorted and usable form; and (3) impact, the extent to which the information has brought about a behavioral change in the target population. It would appear that the process of dissemination does not propose to bring about change, but only to create widespread awareness of the existence of the invention.

Although the demonstration stage of the diffusion phase seemed apparent to the writer, this terminology could be more misunderstood than any examined so far. In education, there seems to be a number of definitions applied to this term (e.g., demonstration schools, demonstration exhibits, demonstration methods, etc.). However, in this instance there
seems to be little doubt that it means the opportunity for the target system to examine or assess the operational aspects of the invention. It would appear that here lies the possibility for interaction between the innovator or demonstration and the target system, and affords a real opportunity for making evidential assessments and judgments about the invention by the participant observer or change agent.

As noted in Figure I, the end result of the demonstration stage is to build conviction on the part of the target system. This, it would seem, can only take place in a professional sense if members of the target system can undertake professional assessment. This, of course, can occur only if the demonstration provides evidence that can be examined critically. In subsequent chapters, we will examine this phase closely because it supports one of the major goals of the change mechanism and is the reason for the requirement of the change agent.

D. The Adoption Phase

As the model reflects, the trial stage is designed to build familiarity with the invention and to give the target system an opportunity to assess the merits of the invention. It should be carried out without a penalty for failure and in the context of a particular institution or key target area. This is the stage at which the four field test areas constituting this study were brought into complete and independent involvement with the invention. It was here that they could assess the quality, value, fit, and utility of the delivery system designed specifically for this project and in terms of the needs of each participating institution.
The value of the selection of this model becomes apparent when we recognize the logic in the structure as several criteria can be applied at this stage. These, in turn, provide the participant observer with alternative areas to watch and evaluate in a "checklist" approach. He can ask whether or not the invention is adaptable to the characteristics and climate of the local target system. He can decide whether or not the invention has to be totally endorsed by the target system, partially endorsed, or not at all.

The observer can determine whether the problems of feasibility were picked up in earlier field trials or earlier exposure to other phases of the process. He may discover that the use of the invention requires a higher level of professional experience and performance in an institution with a marked weakness in the local system—a weakness that may not be easily remedied. This weakness can take the form of administrative barriers; cumbersome internal working procedures; past related experience factors related to faculty members; or the influence of unintended audiences who become disinterested gatekeepers.

Certainly, he can observe how the invention acts in a naturalistic setting with these professionals. This criterion is comparable to the evaluation of performance used by the engineers who originally packaged the invention, but here we are interested in the action of the invention in relation to a particular situation at a particular institution. We have, then, the opportunity to actually test the validity of the components of the invented solution. It is here that we can evaluate the transportability of the institutional feasibility factor considered during the design stage of the development phase noted in Figure I.
The installation stage nears the end of the continuum and is designed to furnish the opportunity to fit the characteristics of the invention to the adopting target system. This may prove to be an extremely complex and time-consuming stage. In subsequent chapters, we can see just how complex this process can be and how the role of the participant observer must be altered to cope with the problems.

This stage provides for possible major re-designing of the invention, extensive or varied retraining of personnel, or modification of other elements of the operational system that might conflict with the invention. It is proper to assume that the criteria for evaluation are the normal administrative criteria of effectiveness, the extent to which the invention can accomplish the intended end, and efficiency, the extent to which these ends can be achieved in relation to the available resources within the target system. The application of these conditions would imply that there should be some kind of quality control within the system such as those employed in an industrial production setting. Such a system would allow for a measurement of the impact of change on the operating target system.

When we examine the last stage or process noted on the continuum, we have reached the point at which the invention becomes a part of the adopting institution. It is no longer only an invention but it has been assimilated into the on-going operation of the given target system. This implies that an institutionalized change is regenerative in nature and will be regularly supported as a commonly accepted component in the local scheme of things.

Whether or not this model can or should be replaced with a dif-
different one is of limited consequence here. What is important is that this scheme is a logically structured plan that offers a participant observer the opportunity to know "when he gets there" so far as initiating innovation and change in the context of an educational setting.

"The illusion of proceeding systematically through these steps is just that--an illusion." These are the words used by Dr. David L. Clark, Dean of the School of Education, Indiana University, when he described another version of this model as a quasi-linear sequence. This scheme does, however, identify and classify activities or functions that must be performed to effect change.

Summary of the Chapter

These pages have been designed to set forth a scheme by which an invention can be studied in the context of an actual learning situation. The learners in this case are instructors on member campuses of a consortium whose major goal is to improve the quality of instruction at these institutions.

This chapter has stated the problem and described the events which led to the writer's interest in conducting such a field test. It furnishes the background information needed to understand the reason for the study, the setting for the work, and has established a scheme by which an investigator or observer can structure measured movement of the

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18 Clark, David L., "Effecting Change in Institutions of Higher Education," Taken from a paper delivered before a Faculty Development Institute, sponsored under Title III of the Higher Education Act, Kansas City, Missouri, November 13, 1967.
invention in the change process.

It is hoped that this study might contribute to the development of a strategy for evaluating the impact of an innovation on a target population and the methods for effecting change using a consortium as the change mechanism. In this way, we can analyze the feasibility of meeting the criteria for effecting change in actual practice. It is further expected that the findings of this study could be used to develop a check-list for subsequent efforts to replicate the procedure.

Although not specifically spelled out as a major goal, the writer believes that the implications of these findings could have considerable impact for higher education in terms of teacher education and media research. This then, is the basis for the study described in the following chapters.
CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Perhaps the most difficult task to be accomplished in this chapter is to establish and justify the reasoning behind the approach chosen to review literature considered applicable to this study.

In Chapter I, we identified the invention as a new visual production vehicle designed specifically for this effort (see page 2). This same invention was defined in terms of the Guba-Clark model as a possible solution to an operating problem and was placed on the model continuum so as to become an engineered package ready for diffusion (see Figure I). It is not appropriate to discuss the details of the visual production system research here nor the basic research that provided the basis for the invention. However, the system design will be discussed in subsequent chapters as it pertains to the actual field test situation.

Likewise, it is not necessary to discuss here the change mechanism used to initiate the invention with the target system. The preceding chapter discussed, in detail, the necessary background information required to place it in the context of the model described there.

We will, instead, combine the invention with the target system to examine the role and function of media in teacher education. This has been done primarily because we are not interested in measuring the actual impact of the invention during a formal classroom exposure. We do, how-
ever, have a primary audience of faculty members who may or may not have been exposed to any kind of teacher training or methods instruction. It is safe to assume that most faculty members who are experts within a given field or discipline have not had a structured program in teaching methods and have not been motivated to supplement their base of experience in this direction.

It seems only logical then, that we recognize that this delivery system for visual materials falls in the media field. Therefore, we are concerned with an analysis of instructional media research as related to the teacher education field. It is on this premise that the following study is submitted.

The Present Status of Media Research in Teacher Education

Empirical research on applications of new media in teacher education appears to be scarce, unorganized, and existing studies are primarily recent. Researchers in the field would be hard put to find more than a few replicated findings. This absence of replication and cross-validation of results seems to be the most conspicuous characteristic of research on media usage in teacher education.

This scarcity of empirical research appears to be somewhat surprising to the writer since one can discover a considerable number of organizations which have technical and professional resources. Some recent publications present large lists of institutions with a host of varied media facilities. Some of these are Brown and Thorton,\(^1\)

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Brugger, Campion and Kelley, Meierhenry and McBride, and VanderMeer. Finn and Perrin list many organizations involved in the development of audio-visual equipment. Several guides can be purchased that provide information relating to research proposals and audio-visual materials, e.g., Center for Programmed Instruction, U.S. Office of Education, Schuller, Finn and Foster, and others. In some instances, agencies have

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2Brugger, J. R., A Survey of Television Equipment and Facilities Used for Purposes of Instruction by Public Schools, Colleges and Universities (Hagerstown, Maryland: Board of Education, Washington County).


7Center for Programmed Instruction, Programmed Instructional Materials, '64-'65 (New York: Center for Programmed Instruction, Teachers College, Columbia University, 1965).


been expressly established to collect and process data on educational media.\textsuperscript{10} It is not clear or evident why so little systematic research has emerged about the new media and teacher education when such extensive sources exist.

There seems to be an inherent complexity of functional characteristics between the new media and what seems to be the process of teacher education. It can be projected that productive media research in the field of teacher education ought to go considerably further than a study of the single medium as a separate instructional end-item. Certainly, it would seem logical to think that such research must consider the manner in which a multi-media approach can be combined to produce an expanded impact on learning. Some complex problems of instructional patterning in the area of the use of multi-media strategies are being examined both in college courses and in relating television to programmed instruction.\textsuperscript{11} Some of the most notable of these were done by Gropper,\textsuperscript{12} Pagano,\textsuperscript{13} Capen,\textsuperscript{14} and Gryde.\textsuperscript{15} These do not seem to indicate


that a great deal has been conducted on the combined use of media in the field of teacher education.

Media research must focus not only upon the teaching methods and procedures, but also on the course content or skills to be learned. The writer believes that media research has responded to the inherent complexity of the phenomenon being studied much in the same manner as has past research on complex social and educational problems, e.g., student tension, civil rights, participative governmental management, etc. The issues seem to become atomized and divided for detailed analyses into minute segments extracted from the general problems.

An Orientation Toward New Techniques

Research in uses of new media in the teacher education area has been largely technique-oriented and focused on short range goals or offering an immediate solution to administrative problems. Perhaps this is why media researchers seem to begin to examine the educational utility of a given set of instructional devices and appear to be reluctant to deviate from studying these tools even when the educational problem under study has been solved or deemed as unsolvable. Gilbert reflects on this while research is always in the business of testing techniques, when the techniques take precedence over the problem, much is lost. The questions of the greatest


social interest are: How can neurosis be alleviated? How can arithmetic be effectively taught? How can a schizophrenic be made normal? How can reading deficiencies be overcome?\textsuperscript{16}

The guiding philosophy of this work could parallel these salient points. Although the attempt here is to estimate the potential value of a new delivery system for producing color visuals, the real problem is to study the change process as a social process in an educational setting. And even though the attempt is to estimate the value of new media, the methodology does not supply the base of the inquiry. The problem of adoption is to be solved and must be the essential focus rather than falling into excessive devotion to the media tool. In this way, we can learn from the knowledge gained by means of the media tools.

Beyond the scarcity of theory-directed media investigation noted earlier, one recurrent problem of the interpretation of data seems to illustrate the failure of media research at a theoretical level and the confusion that is introduced by the desire to draw immediate administrative conclusions. The problem that becomes apparent is the interpretation of the "nonsignificant difference" result that is so predominant in media research. Significant differences are absent in studies of student learning resulting from the use of new media as compared with learning brought about by "conventional methods." Also, these same nonsignificant differences are not remedied to any great degree when associated variables, which might be expected to influence the effectiveness of In-

structional media, are added. To illustrate this thought, it does not appear that adding various "feedback" devices improves televised instruction as noted by Carpenter and Greenhill\textsuperscript{17} and Wolgamuth.\textsuperscript{18}

Further, studying the attention span of students receiving televised instruction does not seem to help either as seen in the Klapper study.\textsuperscript{19} Varying the size of the viewing group does not measurably add to the effectiveness of televised instruction.\textsuperscript{20} There are suggestions that the physical location of the viewer in the exposure environment may have some influence on learning.\textsuperscript{21} However, this too, has been challenged.\textsuperscript{22} These statements would appear to be overcritical of some media research design but are used to point out that to date, media research in teacher education has harvested a bumper crop of statistically nonsignificant differences in the field of televised instruction. The writer has


\textsuperscript{22}Mayers, A. E., "The Effects of Student Location and Teacher Role on Learning from Instructional Television" (unpublished Ph.D. dissertation, Stanford University, 1965).
singed out this particular area because it represents perhaps the most sophisticated electronic medium and the one that most readers might relate to.

The impact of these nonsignificant differences compounds in magnitude when viewed as a common obstacle in attempting to draw general conclusions from research--the unreported result. There seems to be a tendency to regard negative results as less interesting, illuminating, or worthy of publication than positive findings. These nonreported, negative findings could create an impression that a larger proportion of positive results was found than was actually obtained.

The lack of published reporting of nonsignificant differences is perhaps augmented by the fact that in many instances costly equipment must be made operational before its utilitarian value can be confirmed. Certainly, nonsignificant differences discovered during experimentation could result in considerable embarrassment to the extent that media investigators would have some difficulty in reversing personal commitment and discontinuing its use.

It would seem that negative results could be almost as significant and meaningful to the progress of research as a series of positive findings. One might ask here--how have nonsignificant differences been interpreted in the media field? Generally, one finds that they are said to indicate: (1) equal effectiveness of devices compared; and (2) that all media studied are effective instructional tools. What seem to be further illogical conclusions are usually drawn by implying that, since inequality of effectiveness has not been experimentally observed, deci-
sions on media selection should be made on such nonscientific criteria as administrative ease and economy. An indication of these misconceptions is reflected in this statement by Norberg:

No doubt the force of the criticism of redundancy in television research arises from the sheer number of studies and the monotony of the ubiquitous finding, "no significant differences." From the sheer quantitative weight of such evidence, it is argued that there can be no doubt, "that television can teach." I would agree. The fact is there. It has been proved...23

Further evidence of this can be noted in a statement by Popham:

The lack of significant differences between the conventionally taught and the tape-taught students in this study ... allows the conclusion that the tape recorded lecture approach ... proved effective.24

Hoban appears to have made what the writer believes is the same observation about the misinterpretation of nonsignificant differences when he stated:

As far as the University faculty is concerned, the reported findings on comparative effectiveness should be decisive. If research results were unique determinants of decisions on teaching methods of college and university instructors, these teachers would henceforth enthusiastically welcome closed-circuit television with open arms.25

The writer interprets this statement as meaning that these are theoretical misinterpretations of nonsignificant differences. It would


therefore, be illogical to interpret the failure to demonstrate that conditions that are unequal as proof of their equality.

It would appear that failure to reject the null hypothesis provides no positive evidence that all media are effective and equal in impact. It is logical then, to question that if typical classroom procedures represent the worst methods, what then is gained by demonstrating a nonsignificant difference between these methods and the use of instructional media?

It is encouraging to note that the writer was able to discover two studies that may indicate that a new body of literature is developing which submits more plausible measures for the ubiquity of nonsignificant differences. One of these studies suggests that effective factors in media presentation may be "masked off" or cancelled out by other related factors and that perhaps nonsignificant differences may result from poorly conceived research designs.26 Schramm tells us that the period of treatment or instruction with new media may be too short, or conducted with a sample that is too small, or that it has been evaluated by a measuring instrument that is too insensitive.27 Here, he alludes to what seems to be a crucial issue in media research: Instruction supplied by media conditions must be carried on for a sufficient period of time if


discernible impacts are to be expected.

Whatever the reasons may be, there seem too few empirical studies that have emerged to report sufficiently strong and positive findings to motivate a continuing succession of replications to verify completed work. The writer hopes to provide in this study a framework from which others might attempt the approach to contextual evaluation of a medium invention and hopefully its adoption into an on-going situation.

Some Processes Are Unstudied

It would not be presumptuous to generalize that the trend in media research has been to perform comparative-effectiveness studies by measuring an initial status variable, introducing media exposure or experiences, measuring a final status in order to evaluate change, and then comparing degrees of change among groups with different media experiences. These analyses of gross input-output changes seem to ignore the mediating processes of interaction that take place between students, instructors, and media materials which result in the observed overall change. This is why the writer embarked on a study that had as its measuring device, a model that was based upon a social process rather than being completely product oriented. We are interested here in adoption of an invention through a structured, but feasible, process and one that is applicable in the context of the actual environmental conditions.

Although some audience response or feedback devices has been used in teacher education to provide a continuous record of student response to media, the writer found only one that attempted detailed descriptions of the mediating process of learning which may or may not be noted in the
pre-post change assessment. Most experimentation has examined overall gross effects of instructional media and has ignored what produces these effects in the minds of the learner.

Add to this a profusion of testimonials for media use rather than empirical reports of effectiveness and you have a generalized picture of media research as the writer found it reflected in the literature. It appears that when criteria that go beyond the investigator's own impressions are applied, these become subjective impressions or indirect testimonials of students and teachers—as noted by Follis and Thompson. This phenomenon may be a passing era in media research on teacher education as the early phases of a developing field of knowledge matures.

The scarcity and recency of research, the inherent complexity of the phenomenon, the lack of attention to the application of a systematic theory, the failure to study intervening processes, coupled with a profusion of nonsignificant difference factors, all seem to contribute to the lack of replicated findings on the contribution of instructional media usage on teacher education.

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This absence of replicated information not only affects the degree of confidence that teachers can place in the stability and reliability of media research, but it also indicates the paucity of data on the parameters of effectiveness of both the single media usage or combinations of media in terms of the much touted multi-media approach. Certainly, it appears clear that no single pattern of media usage will emerge as most effective under all conditions. It would seem, therefore, that the salient questions become those exploring the various limits of effectiveness. We should be asking questions as to: Under what conditions does a given medium or specific combination of media produce discernible effects on learning? What sets of conditions maximize these effects or cause them to disappear? Unfortunately current media research has not, it seems to this writer, established limits that describe the gradations of impact of instructional media on learning.

This somewhat dismal picture of the current status of media research as applied to the field of teacher education is offset by several organizational hierarchies that offer a potentially strengthened vehicle for the collecting of scientific research in this area and could produce more work in this area than in any other emerging field of research. Although research efforts devoted to media usage in teacher education seem to be scattered at the University level, greater potential is seen in work being sponsored by a single branch of the U.S. Office of Education Media Branch under Title IV of the National Defense Education Act. In addition to the dissemination program of the U.S. Office of Education, at least one professional journal, the AudioVisual Communications Review,
serves as a clearinghouse for media research studies, publishing supplements of recent media research. This same publication presents collections of contributions from conferences and group reports, e.g., Joint Committee on Programmed Instruction and Teaching Machines, Norberg, Miller, et al., and Meierhenry. This would indicate that these are signs that cumulative progress can emerge from efforts to make media research findings more cohesive and comprehensive.

Some Methodological Issues in Media Research

Research efforts on the role of media in teacher education encounter the same methodological obstacles encountered when an attempt is made to analyze teaching-learning transactions as noted by Gage, and Medley and Mitzel.

Perhaps the most constant criticism of media research noted by


the writer, has been the reliance of investigators on experimental designs that ignore the multivariate complexities of both the instructional procedures and potential results. McCall\textsuperscript{37} notes that the early history of educational experimentation is marked by "one-variable-at-a-time" research. While it is recognized that instructional processes depend upon the joint action of a variety of interacting variables and while research designs have been incorporating multivariate evaluations as noted by Borko,\textsuperscript{38} Lindquist,\textsuperscript{39} and Messick,\textsuperscript{40} little use of multivariate analysis has been made of media research in teacher education. Consequently, there is a large gap between the multivariate complexities of classroom instruction and the nature of current media experimentation. Thus, we can recognize further reinforcement for the need for the contextual study technique that is the basis for this work.

Multidimensional characteristics of instruction affect the selection and even the definition of both the dependent and independent variables in media research. The writer believes that it is not realistic to isolate for study a single variable in attempting to assess the effects of variations in instructional procedures. This work has addressed

\textsuperscript{37}McCall, W. A., How to Experiment in Education (New York: Macmillan, 1923).


\textsuperscript{39}Lindquist, E. F., Design and Analysis of Experiments in Psychology and Education (Boston, Massachusetts: Houghton Mifflin, 1953).

itself to the complex task of recognizing the influence of the real problem of influencing teacher behaviors rather than relying on experimentally controlled study design.

as projected by Bantock and Martin. Certainly, as criteria become better defined, success in locating meaningful scientific results should show marked improvement. Turner and Fattu offer some thoughts, however, as to the distance yet to be covered in this area when they state:

Seventy years of research on teacher effectiveness have not added much to our systematic knowledge, and it is difficult to see how another seventy can do more if the same procedures are followed. When every study must virtually start anew at the same place as its predecessor, little increase can be made in organized knowledge in the field.

Delays continue in arriving at solutions to the problems of defining and measuring criteria for teacher behavior by failing to apply adequate taxonomies to the task of teaching. These taxonomies of teaching performance, if comprehensive in nature, could facilitate research progress byaffording meaningful categories for the description of teaching and specify better teacher-training requirements. These, in turn, could be logically and empirically matched with other research. This then, would mean that a generally accepted and integrated taxonomy of teaching could facilitate the research solution of the criterion problem and would permit precise estimates of the applicability of research.

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findings to actual teaching situations. Studies by Gage, Reed, Mitzel, Ryans, Smith and Meux, and Withall have offered reasons for proposing designations for major dimensions of teaching behavior. However, the writer could find little application of these suggestions in media research.

It would seem, therefore, that we lack not only a meaningful taxonomy of teaching behavior, but also a useful taxonomy for the students' learning in the on-going classroom situation. There appears to agreement among such experts as Flanders, Hughes, Gross and


\[58\] Hughes, Marie M., Development of the Means for the Assessment of the Quality of Teaching in Elementary Schools (Salt Lake City: University of Utah Press, 1959).

\[59\] Mitzel, H. E., and Gross, Cecily F., "The Development of Pupil-
Anderson\textsuperscript{60} that the decisive criterion for the effectiveness of a teaching strategy lies in the learning of students in a classroom. Taxonomies by Bloom;\textsuperscript{61} Krathwohl, Bloom, and Masia;\textsuperscript{62} and Melton\textsuperscript{63} offer means for specifying definable changes in student responses to variations in the instructional process but, these too, seem to have had little direct impact on media research in teacher education.

If we can subscribe to the belief that these taxonomies have been neglected, it seems only logical that relationships between media use in teacher effectiveness and training have not been established. Therefore, it seems equally logical that for media studies of teacher education it would be important to recognize that teaching is an interactive process among persons functioning in a complex context and that there are many kinds of effectiveness for teachers, students, programs, teaching objectives and even classroom situations. These general conclusions point to what seems to be two major needs: One, criteria that objectively reflect the complex and ever changing behaviors which constitute teaching performance, and secondly, for experimental designs


which can incorporate these criteria adequately as reflected by Cooley and Lohnes,64 Eigen,65 or Campbell and Stanley.66

Summary of the Chapter

In these pages the writer has looked at the issues that provide a kind of "state-of-the-art" status for media research as applied to teacher education. There has been no emphasis on pre-service or in-service orientation so far as this review is concerned. Instead, the writer has tried to examine some of the reasons why teachers do not make greater utilization of new media technology. This chapter has tried to bridge this gap by developing an awareness of the strategy needed to bring about adequate taxonomies coupled with defined objectives that can be properly placed within the framework of a model for measurement.

Since the target population in this study is a group of teachers in higher education, it was believed that this approach was appropriate. Readers of this work may feel that there has been undue criticism of media research in general, but it is hoped that they will also see that media research as applied to teacher education has been weak and should be strengthened. It is further hoped that the inadequacies noted can be more readily studied as contextual field work is accomplished and completed.

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CHAPTER III

METHODS AND PROCEDURES

Introduction

This chapter will examine the methods and procedures used in attempting to bring about innovation and change in a contextual setting on four campuses within a consortium. Methods and rationale used in determining campus selection, involvement, and the application of the Guba-Clark model for change will be described. The color delivery system will be described in detail along with a general overview of its origin and development in order to fix its placement in the procedural scheme.

Earlier information described the consortium setting in which this study took place. The history, philosophy, and major thrust areas were set forth in such a way as to recognize that the professional consortium staff works by invitation and in terms of the priorities and commitments at each member institution. This means that, although by design, the consortium is a catalytic agent for innovation and change, universal or total commitment to each program or major thrust area varies on each campus. This phenomenon made participant selection more difficult since endorsement required a recognition of the need; a positive mandate to proceed; and a commitment to become involved. It also reflected an actual contextual environment since the catalyst does not have hierarchical status or power to initiate action except as agreed to by the member
institutions. This situation was used by the writer to parallel the actual situation faced by every staff person who, as in any industry, does not have a line function to perform, but does have a responsibility to develop programs for implementation at the line level. It was believed that by conducting the study under rigid personal discipline standards, the results could be evaluated as a true field study experience rather than a controlled or manipulated laboratory experiment.

Since this entire project will, by design, ignore the research and development of the color delivery system in terms of a valid stimulus, it would be appropriate to develop this chapter in a historical pattern just as the program itself progressed. Let us move then to the color system as an invention in its own right to understand why the entire project became one that afforded more than a reasonable chance for success and subsequent adoption.

The Color Delivery System

The color delivery system used in this study is a specially designed package of equipment and materials designed for classroom application. The system noted here was not available on the commercial market when this study was begun. This kit of materials was developed by modifying a more complex and sophisticated system used by commercial television stations to rapidly produce inexpensive color visuals of high quality.

The commercial system referred to is a product of commercial television. More specifically, it is the product of the pressures of time and economics as they exist in an industrial setting. It was developed
by a professional practitioner in the field to serve his own needs and was later made available to the industry as a new product.

The typical "art department" of a commercial television station, as it is conventionally recognized throughout the industry, is small and understaffed when compared to other production support activities. It is in this department, however, that the small staff is held responsible for the full spectrum of graphic visual needs for the station. Included are set design, on-camera graphics, slides and films, sales presentations, and magazine and newspaper promotional graphics. As a result of these responsibilities many commercial stations use free-lance or commercial art studios to obtain the customized graphics required to produce programming that is complete and effective.

Television has become one of the greatest users of "one time" original art pieces. This need is one of the major concerns of station management and production personnel because of the high consumption rates and high production costs. The writer visited seventeen television stations in a three state area around Kansas City and discovered that only four employed more than three graphic specialists and the majority did not even note an art department on the organizational or functional chart. Instead, there was usually one person who purchased the needed graphics support from outside suppliers. It was interesting to find that even the smallest station required seventy-five to one hundred customized visuals per week to support news broadcasting alone. These were one-time presentations and the visual would not be used in the same form again. It is little wonder then that visual production support is so important
in an industry whose activities are dedicated to presenting material visually and for profit, too.

In 1960 the inventor and developer of this system found himself in a research and development role with a major multi-station broadcasting and television corporation. The research activity was headquartered in Kansas City where the problems described earlier were a part of the local station environment. His task became evident—develop a delivery system that could rapidly produce inexpensive high quality color visuals that could be compatible with a host of projection techniques ranging from slide projectors to fully animated films.

The system that resulted from this effort was developed in 1960, and the patent was applied for in 1967, by Mr. Douglas E. Lowe, who has since become a vice-president with the manufacturing and marketing company for this system. The first visual was utilized in a telecast over station WDAF-TV, Kansas City, Missouri, on July 4, 1960.

During the years 1960 to 1967, Mr. Lowe perfected the high intensity pigments used with the system and experimented with several kinds of applications for various projection techniques. The system that evolved was a precision arrangement of modified cameras, light tables, and software materials that could make use of the existing graphic materials for modification into customized pieces of original art with color consistency that would not be lost through varied projection methods.

The equipment itself was programmed and keyed to simplified formulas for each projection technique so that these high quality visuals could be produced easily by non-artist kinds of personnel. In this way,
relatively unskilled personnel could be added to the station staff and trained to perform well in a short period of time at a cost that could be afforded by the smallest station.

During a demonstration meeting of the system in 1967, it became evident that here was a delivery system for visual materials in full color that, if practical for classroom use, could help solve one of the major reasons noted earlier as to why many of the instructors within the consortium did not use audio-visual materials in their classroom teaching.

Negotiations were begun to explore the possibilities of modifying this system for field test applications at the classroom level. Both the inventor and the station management were interested in contributing to the field of education and were willing to undertake the venture at no cost to the consortium.

The design criteria set forth by the writer were simple to state. The specifications were that:

1. The system should be capable of producing high quality color visuals from existing materials available to the classroom teacher.

2. It should have the capability of producing the same high quality visuals from line illustrations normally produced by academic personnel untrained in the graphics field.

3. The customized software should be adaptable for the most common types of projection equip-
ment found in classrooms within the region—normally 35mm slide projectors and overhead transparency projectors.

4. The system should be simple to operate and packaged so that it could be easily moved from one classroom to another. This would facilitate the fact that only three of the member institutions had a centralized audio-visual program.

Within three months the writer was presented with a specially designed prototype color system developed to the specifications set forth above. Again, both the inventor and the station management agreed to aid the writer in trying to discover whether a system designed to help eliminate one of the major deterrents to using visual materials in a classroom, could motivate greater utilization of these materials.

The special package of equipment and materials included a single modified copy machine using a wet process to develop the special film. In addition, the following raw materials were attractively packaged in a transportable kit.

SPECIAL COLOR DELIVERY SYSTEM MATERIALS KIT

Item 1. 500 Sheets Transofilm—Matrix Film
Item 2. 4 Gallons Developer
Item 3. 500 Transparencies
Item 4. 4 Special Red Sable Brushes
Item 5. 8 Special Felt Tip Pens
Item 6. 10 - 13 oz. Aerosol Containers (Background Paint)

Item 7. 50 Sheets Special Tracing Film

Item 8. 100 Sheets Production Copy Paper

Item 9. 10 Equally-Spaced Hue Division Colors (30 1 oz. Bottles)

Item 10. 6 Sheets Transfer Letters

Item 11. One Instruction Manual

With the completion of the first prototype delivery system in hand, certain tests were made and minor packaging revisions were accomplished prior to a final evaluation of the engineered package. When it was decided that the system represented a completed one-of-a-kind unit, we met to implement a program within the consortium. After several meetings, it was determined that the supplier had no immediate interest in the educational market; however, they would be willing to build a limited number of these systems if an interest could be generated among the colleges and universities in the Kansas City area. Both the inventor and the station management agreed to provide enough systems to service interested members. They further agreed that they would assist member institutions as free consultants as they developed the customized materials. It was also stipulated that there would not be any restriction placed on the writer or the participating institutions as to results, usage, or methods used in producing new visual materials.

It would be appropriate to move from further discussion of the color delivery system at this time only because the vehicle for change being investigated here is not the color system itself, but rather the process by which change does or does not take place in a contextual set-
ting within a consortium. The writer was satisfied that the basic re-
search that took place in the development of the commercial system was
valid in accordance with the model being used here to study the change
process. The limited description and overview as to how the prototype
system was invented and designed again follows the two phases noted in
the development stage of the same model (Figure I).

Suffice to say that an invention was developed and both hardware
and software were available to the writer. The invention was developed
with the involvement of the writer so that the development of the special
package itself had a structured program behind it. The very specific de-
sign criteria supported the possible solution to the known problems so
stated in the opening paragraph of Chapter I.

Selection of the Participants

If we can subscribe to the premise set forth in Chapter I that a
consortium is, by design, an agent for change, we must also accept the
notion that it is a mechanism that is accepted by the member institutions
as an extension of each institutional staff and that the vehicle can sup-
port individual member effort as well as the collective whole. It was on
this basis that the writer requested a meeting of representatives from
each campus to discuss the merit and possible involvement in the program
reported here (See Appendix I). This memorandum was distributed to all
presidents, academic deans, and officially designated audio-visual repre-
sentatives on each campus. The writer hoped that since implementation
and involvement would succeed only at the individual campus level, it
would be desirable to have the highest level of endorsement for partici-
pation. In this way, it was felt that the highest source credibility at the local level might enhance the program and bring about a positive change.

The initial exploratory meeting was held and twelve of the sixteen campuses were represented by twenty-four individuals. The level of participation included three presidents, four academic deans, five departmental chairmen from several disciplines, and twelve audio-visual representatives from both centralized and decentralized programs.

The meeting was designed to serve a two-fold purpose since it supported both phases of the diffusion stage of the Model (Figure I). First, there was a general orientation period designed to inform each representative of the recommended program and to reinforce the written communication (Appendix I). The second portion of the meeting was devoted to a demonstration of the system and was designed to build conviction as to the merits of the system and of the potential impact at the classroom level.

Each representative was asked to evaluate the system in terms of his or her own campus needs. Each was asked to support that need through active participation in testing the adaptability and feasibility of the system in the context of their own campus. It was noted also that each participant would be asked to defray the overall cost of their system by purchasing the raw materials at a portion of the supplier's cost. It might be pointed out here that this proposition was made to strengthen the involvement through a token financial commitment rather than accepting a dole.
Perhaps it is well to note here that the campuses represented during this meeting provided an exceptional opportunity to enlist participation ranging from small private liberal arts colleges to our largest state assisted university campus. The writer was quite fortunate in that the four interested members provided a unique diversification and furnished the opportunity to adapt the program to four distinctly different contextual settings. The descriptions that follow are accurate as of the 1968-69 academic year, and each initial paragraph is the official statement of purpose of the institution as stated in official publications. These descriptions are entered here to furnish an insight into the environments under which this work was undertaken.

College A

Established 1883.

Four-year, Presbyterian, Coed.

Purpose.—"The aim of this college is to assist in the development of young men and women who will be able to meet the needs of their world and to achieve their goals through a Christian, liberal arts education."

Students.—Total enrollment is 759 full-time and 25 part-time students. Class enrollment is 532 freshmen, 107 sophomores, 55 juniors, 65 seniors, and 25 others. Students by state origination are: Missouri, 86; and the balance from 29 other states and 10 foreign countries. Students by religious preference are: Presbyterian, 209; Catholic, 181; and the balance from Protestant denominations and other religions. Ninety-five percent of the students are housed in college dormitories.
Program.—The college is on a trimester system with some courses on a shorter summer term basis. Degree offered is the Bachelor of Arts. Major programs are: Biology, Business, Chemistry, Christian Education, Economics, Elementary School Content, English, History, Mathematics, Music, Physics, Psychology, Sociology, Spanish, Speech and Dramatics, Education and Physical Education. Special programs include an independent study program, advanced standing program and a junior year abroad study program. It is regionally accredited by the North Central Association and accredited by other appropriate agencies. The library has 32,000 volumes and 425 magazine and journal subscriptions. The college enters into intercollegiate competition in basketball, baseball, tennis, track and wrestling (NCAU Conference).

Faculty.—The college's faculty consists of 11 Ph.D.'s; 3 Ed.D.'s; 27 Master Degrees and 2 others. The student-faculty ratio is one to twenty students and the average teaching load is 10 trimester hours.

Campus and Financial Information.—Located 135 miles north of Kansas City (two and one-half hours driving time), the campus consists of 57 acres. Plant valuation is $3,141,374 and the annual operating budget was $1,372,825. Composite fee of $905 per trimester includes room, board, tuition and fees.

College B

Established 1929.

Four-year and Graduate, Public, Coed.

Purpose.—"It is the purpose of this university to provide its students with that degree of broad liberal education that will enable
them to participate significantly in the life of their community and also
to afford them the rigorous preparation in depth that will equip them to
take their places as specialists in the fields of their choice."

Students.—Total enrollment is 5,069 full-time and 3,349 part-
time students. Class enrollment is 1,894 freshmen; 1,155 sophomores;
1,078 juniors; 860 seniors; 2,595 graduate and professional students;
and 836 others. Forty-five states, the District of Columbia and 34 for­
eign countries are represented by the student body. The university has
three national social fraternity chapters and two national sorority chap­
ters.

Program.—The university is on the semester plan with an eight-
week summer term. Degrees offered are Bachelor of Arts, Bachelor of
Science, Bachelor of Business Administration, Juris Doctor, Bachelor of
Music, Bachelor of Music Education, Master of Arts, Public Administration,
Master of Laws, Master of Music, Master of Music Education, Doctor of
Dental Surgery, Education Specialist, Doctor of Philosophy (Chemistry,
Mathematics, Education, General Education, and Pharmacy), Doctor of Musi­
cal Arts, Graduate Diplomas in Dentistry and a Certificate of Dental Hy­
giene. Major programs are American Culture, Art, Biology, Chemistry,
Business and Foreign Language, General Engineering, Geology and Geography,
History, International Relations, Mathematics, Medical Technology, Music,
Nursing, Pharmacy, Physical Education, Philosophy and Religion, Physics,
Political Science, Psychology, Sociology, Speech and Theater. Special
programs include an honors program. It is regionally accredited by the
North Central Association and accredited by other appropriate agencies.
The library has 311,660 volumes and over 2,000 magazine and journal sub-
Faculty.--The university's full-time faculty consists of 154 Ph.D.'s; 20 Ed.D.'s; 42 D.D.S.'s; 115 Master's Degrees; 115 J.D.'s; 45 Bachelor Degrees; and 22 others. The total faculty, including part-time, numbers 879.

Campus and Financial Information.--The university is situated on nearly one hundred acres in the heart of the cultural center at Kansas City. The present plant and ground are valued at approximately $12,000,000. Board and room cost approximately $780 per year.

College C

Established 1924.

Four-year, Catholic, Women.

Purpose.--"This college is a private, full-accredited liberal arts college dedicated to the total development of today's woman in a climate of academic excellence. The curriculum includes pre-professional training in certain areas within the liberal arts tradition. Established and directed under the auspices of the Atchison Benedictine Sisters, the college provides residential facilities for 592 women and coordinates its academic and social programs with St. Benedict's College for Men."

Students.--The total enrollment of 746 included 605 full-time students and 141 part-time students. The breakdown was 133 freshmen, 112 sophomores, 89 juniors, 83 seniors, 47 special students and 141 St. Benedict's College students. Students originate from over half the 50 states and 12 foreign countries.

Program. The college is on a semester plan with an annual summer
school which it administers in cooperation with St. Benedict's College. Degrees offered are Bachelor of Arts, Bachelor of Science, Bachelor of Science in Education, Bachelor of Music, and Bachelor of Music Education. Major and minor courses of study are biology, chemistry, economics, education (elementary and secondary), Fine Arts, with a concentration in the art of drama (new this fall), French, German, health and physical education, history, home economics, Latin, mathematics, philosophy, political science, psychology, sociology, Spanish and theology. Special features include: (1) cooperative academic and social programs with St. Benedict's College, (2) a junior year abroad, (3) the Cooperative Urban Teacher Education Program, an off-campus service study program to train teachers for positions in culturally-disadvantaged areas, (4) opportunity for undergraduate research in mathematics with support of National Science Foundation fund, and (5) educational television in classes. The college is regionally accredited by the North Central Association. It is also accredited by NCATE (Elementary Education) and other appropriate agencies. The ultra-modern Feeney Memorial Library has space to accommodate 150,000 volumes and subscribes to some 370 periodicals and newspapers.

Faculty.—The college faculty includes 15 Ph.D.'s, 43 Master's Degrees and five others. The student-faculty ratio is 14-1 and the average teaching load is 12 semester hours.

Campus and Financial Information.—Located 50 miles north of Kansas City in Atchison, Kansas, the college has a plant value of $5,837,000; an endowment of $198,500; and an operating budget of
$1,080,000. Tuition and fees are currently $760 per year. Room and board is $800 per year.

College D

Established 1871.

Four-year and Graduate, Public, Coed.

Purpose.--"The program of this college is diversified—and changing—because our world is changing. The principal purpose of the college is to provide the programs, the resources, the faculty, and the facilities to educate young people in a changing world. In many areas the college is educating students for jobs which do not yet exist."

Students.--Total enrollment at the time of the study was 11,000—9,600 on the main campus in Warrensburg and 1,400 at the Jackson County Residence Center in Independence, Missouri. Class enrollment was 4,500 freshmen; 2,500 sophomores; 1,900 juniors; 1,300 seniors; and 800 graduate students. About 9,100 students were from Missouri and the balance from the 49 states and 26 foreign countries. About 75 percent of the students on the campus live in college residence halls. The college has experienced a phenomenal growth rate during the past ten years which is expected to continue during the foreseeable future.

Program.--The college is on the quarter plan and the summer session is the same length as other terms. Undergraduate degrees offered are Bachelor of Arts, Bachelor of Music, Bachelor of Music Education, Bachelor of Science, Bachelor of Science in Business Administration, and Bachelor of Science in Education. Graduate degrees include Master of Arts, Master of Science, Master of Science in Education, and Specialist. Major
programs include Agriculture, Art, Biology, Chemistry, Economics, Educa-
tion, English, Foreign Languages, General Science, Geography, Geology,
History, Home Economics, Industrial Arts, Law Enforcement, Journalism,
Mathematics, Music, Nursing, Physical Education, Physics, Political
Science, Psychology, Religion and Philosophy, Social Studies, Sociology,
Speech, Speech Pathology. In addition to these four-year programs, the
college offers a wide selection of technical and pro-professional courses.
Also offered is an honors program. The school is accredited by North
Central Association, MCATE and NASM. The library has 240,000 volumes and
2,000 magazine and journal subscriptions. The college is a member of the
Missouri-Intercollegiate Athletic Association (football, basketball, base-
ball, tennis, golf, track, swimming and wrestling).

Faculty.—The college faculty numbers more than 500, 40 percent of
whom hold the earned doctorate, the rest of whom have at least Master's
Degrees.

Campus and Financial Information.—Located 50 miles southeast of
Kansas City, the college owns a total of 722 acres of land, 195 acres of
which are in the college farm. Plant valuation is about $36,000,000.
The operating budget for the fiscal year of this study exceeded $9,000,000.
Missouri residents pay an incidental fee of $228 per year (three terms).
Non-residents pay an additional fee of $77 per term. Room and board are
about $225 per term.

Methods and Program Procedures

Earlier paragraphs have been devoted to identifying and defining
each element of this study. The determination has been made that this is a contextual field study and that it will be addressed to the process of change. The design strategy, we know, has been structured around an accepted model designed to bring about change in higher education. By its own definition the model has been used to categorize the following elements of the project.

Thus far, we know that the invention (the color delivery system) is an available resource and we have established the source of its development. The target system (for the four participating institutions) has been identified and selected with each having endorsed his own involvement. The change mechanism (the consortium) has been described and justified as an on-going catalyst for change while the writer has been established as the change agent or innovator functioning within that mechanism.

It must be recognized, however, that these elements, though identified and justified, exist only as fragments within an educational context and will not bring about the desired behavioral change unless the true field experience provides a strategy to permit the adoption of the invention. It is to this end that the writer will describe each campus program along with the strategies for implementing the invention.

Certainly, the description of the possible adoption process of an invention into the institutional setting will detail what did or did not happen. What is possibly more important to know, however, is how the faculty perceived the invention and the events surrounding its adoption. Did the color system perform in accordance with design parameters? Did it motivate instructors to use more visual materials? Could the availa-
bility of the system open doors to greater use in the context of the institutional setting? If not, what barriers prevented its use and what mechanisms facilitated its use? These are some of the questions asked earlier and which were built into the methodology used on each campus.

To accomplish this, there was a need to develop a second level set of change agents, each operating with the invention, within the context of his own institutional setting. In each instance, the officially designated audio-visual representative became this agent and, in effect, became a project observer in residence on each campus. This move was made not only because of the nature of the color delivery system and its intended use, but also because the writer could observe the movement of the invention in the context of his role within the consortium. In this way, it was believed that the procedure could duplicate the actual field conditions under which faculties must operate. This procedure also provided a method by which the writer could perform as an outside observer without becoming involved in the local change process except as his involvement pertained to the normal pattern of consortium activities. In this, it was hoped that the presence of an outside observer would not alter the normal relationships between the faculty and administrators. It would also help eliminate the possibility of potential users perceiving the consortium as the change agent and thereby compromise the institutionalization of change mechanisms on their own campuses.

Thus, we have at this stage of the design strategy established the rationale for the internal structure that was developed for each campus. Let us now move to the actual campus programs designed for each
participant and a description of the projects developed using the change model as the guide for implementation.

**Individual Campus Procedures and Pilot Programs**

**A. College A**

The general information furnished earlier established this institution as a private, coeducational, religiously oriented institution devoted to a typical Liberal Arts curriculum. It is appropriate here to develop the audio-visual environment in a more specific way in order to understand the approach used with this institution, especially with regard to the change model.

During the first year that the consortium embarked on a structured audio-visual program for the region, the writer observed that there had not been an organized program established on the campus. Equipment was meager and disorganized. There had never been a recorded physical inventory of equipment and preventative maintenance programming had not been taken into account. Planned obsolescence and acquisition programs were not to be found and the organizational structure did not provide a staff function to fix responsibility.

It so happened that a new library facility was dedicated during that first year, designed to serve as a learning resources center rather than for storage of printed materials alone. The chief academic officer was persuaded to appoint the librarian to supervise the audio-visual program. He reluctantly made the appointment and overtly stated his intent to add competently trained people as soon as budget improvements could be made. The librarian was poorly motivated to become involved and delegated
the task to the assistant librarian who was ill-prepared, but highly mo-
tivated to learn.

During the remainder of the year, they were able to set aside
physical space, complete a physical inventory of equipment and to embark
on an acquisition program to meet their declared needs and intended cur-
riculum changes. These improvements were basic and unsophisticated, but
did create an awareness of the need to develop a solution to improving
the quality of their program through the more effective use of instruc-
tional technology. It was in this setting that the following program
was developed using the consortium as resource expertise and the model
for change to implement the program.

The Adoption Phase.—Through personal observations and in depth
face-to-face interviews, the writer determined that many faculty members
did not use audio-visual materials in the classroom because they could
not develop customized visual materials. Departmental budgets did not
provide funds to buy the required graphics support nor was there a graphs
production department available to service faculty needs. Consequently,
since the instructors had little or no skill in the graphics field, the
newly acquired audio-visual equipment noted earlier was not being used.

These findings were disseminated to the academic dean and the
audio-visual representative on the campus. It was quickly determined
that a pilot program of some sort be developed to encourage greater utiliza-
zation of existing equipment through faculty involvement in producing
their own visuals.

Working within the role of a consortium consultant, the writer
conferred with the audio-visual representative to identify a group of in-
terested faculty members who might be considered as a proper target sys-
tem to work with on such a program. This would certainly fulfill the
bojective set forth in Chapter I to observe peer group relationships in
such a program development and it would furnish the possibility of de-
veloping pilot projects that could utilize the invention.

We discovered that an inter-disciplinary core curriculum group
had been chartered to develop a new course sequence within the Humanities
Division of the college.

It was discovered that a working paper had been issued that made
specific reference to a desire to make "better and more efficient use of
audio-visual aids..." (See item 6 of Appendix II). The audio-visual
representative, a member of the committee, invited the writer to partici-
pate in committee deliberations as a guest resource person with specific
interests in the field of instructional media. It might be pointed out
here that by working by invitation as an extension of the institutional
staff is in keeping with the consortium role and personal experience has
proven this to be the most successful approach.

Exploratory conversations established that the target system
lacked knowledge about both the process of communication and methods by
which communication might take place. This particular group of senior
faculty members were experts in their respective fields but, as noted in
Chapter II, had not been exposed to media methods or theory. They were,
however, motivated to learn and were willing to experiment.

The stated objective for this committee activity was to formulate
a new solution to an operating problem or to a class of operating prob-
lems or as the model reflects--to innovate. The Heritage Program Com-
mittee was faced with such a challenge. The problem to be solved was to develop a newly integrated core curriculum designed to support a major stated goal of the college. In addition, it was desirable to incorporate the use of new media technology into the presentations. The criteria of appropriateness, viability, and potential impact were considered during our meeting.

Each member expressed his own thoughts as to the appropriateness of film, charts, audio video tape, as possible software areas to explore for incorporation into the program. Some verbally expressed a marked resistance to using visual materials as supplementary materials or as a means for total teaching in content areas. The idea of programmed instruction, as proposed by the second level change agent, did not appear to stimulate any positive response. Three of the twelve-member committee did, however, express an interest in using visual, unavailable materials. The areas were in the fields of History, Art, and Christian Education. In each instance it was found that commercial suppliers did not have material packages that could be made transportable from one level to another in terms of subject approach. It became evident that each would have to design his own block of learning experiences using customized materials.

It was at this point in the discussions that the invention (color delivery system) was brought into focus. It was here that the second level change agent, in this case the officially designated audio-visual representative, functioned in the model implementation activity performing in the diffusion phase of the model. Most of the members of the committee had attended a full faculty demonstration of the system at the
time it was delivered on the campus. Some had expressed interest in its potential at that time; however, the committee assignments had not been made at the time of the demonstration. Therefore, there was meager reinforcement of the system potential between that first exposure and this time of need.

It was at this stage of the deliberations that the campus audiovisual representative assumed a leadership role that she had not attained or assumed in the past. She told the committee members about the color delivery system that was designed specifically for their use and said that it would provide a production capability for the customized visuals that they were interested in developing.

The committee moved to an area within the library complex for a demonstration of the color delivery system. Here they could evaluate its potential use as well as the kinds of support that it could provide for the new curriculum change. The audio-visual representative was unaware of the structured model or its application to this particular project, but was intuitively following a logical step by performing within the dissemination stage of the diffusion phase of the model.

She was, in effect, attempting to create a wide spread awareness among the committee members of this new invention among the group. The group was examining the possible impact of this system as an aid in re-designing a major core program. Simultaneously, she was demonstrating the use of the system by providing each committee member with an opportunity to examine not only the contents and the procedures by which it could be used, but they were given an opportunity to practice developing customized visuals.
Each person brought to the demonstration area existing graphic materials in the form of books, magazines, technical journals, etc., that were related directly to their particular area of interest. They were able to copy from this existing material those items that they would like to see used as a visual in their classroom. They not only copied the material, but they watched the film develop and then practiced with the specialized pigments to color the visual and produce a one-time art original. In this way, the audio-visual representative was building conviction to reinforce use of the color delivery system in the total program being developed.

Certainly the criteria set forth in the model included to determine the credibility, convenience and evidential assessment of the system was a part of the demonstration technique. So far as this activity and its relation to change was concerned there was little doubt that the demonstration was designed to build conviction about the invention. An afternoon was devoted to the demonstration and it ended with each committee member returning to his respective office having produced several customized visuals that pertained to his special area of expertise.

During the next regularly scheduled meeting of the committee, the number of declared potential users had grown from its original three to a total of seven who were willing to work in cooperation with their colleague in developing a program that would utilize the color delivery system as a support to the new Heritage Program. Several members began to recognize the possibility of certain kinds of visual materials being shared between two disciplines. Others saw the possibility of creating visuals that would be applicable to a second level of a course program. This, they believed
would build a continuity that they were unaware of before. As the dis-
cussion progressed, they found themselves actually determining what kinds
of visuals could be produced under the adoption phase of the model. The
first stage, of course, is the trial period designed to try out this in-
vention in the context of a particular situation. They discussed the
adaptability and the feasibility of the kinds of visuals that might have
interdisciplinary ramifications. They were, without being aware of it,
fulfilling the objective set forth in the trial stage by building famil-
liarity with the invention and were providing a basis for assessing the
quality, value, and the utility of the invention within the context of
their own institution.

From these discussions three individual members decided to devel-
op specific programs that would use the color delivery system to produce
visual materials. One program was in the field of Art History, a second
emphasized Christian Ethics and a third in the area of World History.
Details of each program are furnished in the paragraphs that follow.

1. Art History.—The art historian was a creative
person, and was the first early adopter to develop
a tangible and measurable end item. He decided to
create a 35mm slide program depicting man's per-
ception of human anatomy through an analysis of
sculpturing. He chose representative pieces that
were typical of early efforts in wood carving and
progressed to the most sophisticated of stone car-
vings. To highlight the kinds of concepts he be-
lieved would best illustrate this technique, he
chose several pieces created by Michelangelo. The writer was invited to consult with him in designing this particular block of learning.

It might be well to point out here that this kind of relationship was in keeping with the role of the writer as he functioned within the framework of the consortium setting. In addition, it provided an opportunity to observe the change process as it might apply to the model. Through this arrangement we were able to obtain a comprehensive set of 35mm slides available from various commercial suppliers in the art field. Once the slides were placed in sequence in a cartridge, a review could be made as to sequencing and the kinds of dialogue that might be developed to support each period of sculpturing. It was here that the art historian recognized that he could emphasize specific details taken from various pieces in order to highlight the kinds of perceptiveness that he wanted to illustrate in terms of man's sophistication and growth. It was decided that tracings would be made of the actual sculpturing depicted on a slide by using the special pencil film furnished with the color delivery system. This effort would produce line drawings that could emphasize a particular detail of a piece to best
illustrate the desired area set aside for analysis. An example was Michelangelo's "David." The art professor produced a slide detailing the stomach muscles found on this particular piece of sculpture. By making a pencil tracing that would highlight the particular area that he wanted to discuss, the professor made a line overlay to show the observational growth that man had reached in observing human anatomy and reflected in the field of art. By intermingling the commercially available items with the customized visuals, the professor was able to develop a comprehensive analysis of the objective stated in the beginning of the project. He made 35 customized visuals that became a part of a programmed block of instruction. It was stored in the library in a format that could be checked out by students and used as a self-instructional tool in gaining an insight into man's artistic growth.

2. Christian Ethics.—The chairman of the department of Religious Instruction had determined that some of the abstractions discussed in his classes were not comprehended by many of the students. He believed that if he could visually illustrate some of these abstractions, he could perform better as an instructor in this difficult area. During conversations
with him, the writer learned that one of the most difficult topics to discuss with a high degree of student comprehension dealt with the various kinds of "love." The chairman consulted with the writer in terms of the instructional objectives of the course. It was decided to attempt to use the color delivery system to produce visuals using graphic symbols to illustrate different kinds of love, i.e., self love. The professor was able to develop symbols in line art that could be reproduced and these were made into overhead transparencies with line overlays and color tints to emphasize particular points. In all, this instructor produced a series of 12 transparencies that presented concepts that he wanted to place before the students.

3. World History.—The chairman of the department of history believed that some of the engineering feats that were accomplished by the early Egyptians were among the finest the world has ever known. He emphasized that these early Egyptians were able to design a tomb within the pyramids that would permit the sun to shine on the head of the Pharaoh's mummy case on his birthday. The descriptions that he found in technical journals and historical documents were detailed in printed form. He found that few illustrations of this phenomenon were available and decided
that he would like to visually show how the Egyptians were able to determine, through astrology and engineering, a method by which this event could happen on an annual basis.

The writer was, again, invited to participate in the development of this project. A study was made of available visual materials that were available and showed various views of the pyramids. Again, using line illustrations that could be used as overlays for overhead projection cells, the professor was able to take color photographs from existing materials, develop a transparency over which he could illustrate this engineering feat. He produced 15 customized, inexpensive, high-quality visuals that depicted the kinds of detail he desired.

This activity in the trial stage of the adoption phase of the model provided the test of the color delivery system. It was capable of providing for the production of customized visual materials by individual who had little or no training in the field of graphics. The quality was excellent and cost factors were minimal.

The individual professors were satisfied with their efforts and moved immediately to implement these visual materials in a pilot program during the summer term. They intended to incorporate the visuals with the new lecture procedures as the revised course material was made opera-
tional. In the case of the project developed by the Art Historian, the students received the material presented in 35mm format with positive reactions and favorable comments. The instructor in Christian Ethics experienced a similar reaction from his students; however, he did discover that some of the graphic symbolism did not prove to be as effective as he had imagined it would be. Some cells were revised and more favorably received by the students. The illustrations of the engineering accomplishments of the early Egyptian society proved highly effective, especially when used in connection with the written material.

The pilot program conducted during the summer was evaluated by the committee as a successful venture. It was decided, after a review with other academic officers on the campus, to establish the revised Heritage Program during the fall term. The ease with which the color visuals were produced was judged to be an asset to the campus and would make available a new instructional resource to all faculty members.

The pilot program started during the summer session and was made an integral part of the total revised curriculum package during the fall term. In-depth interviews, personal observations, and on-site visitations indicated that the Heritage Program committee had disintegrated as a standing committee on the campus. Individual committee members, however, had continued to move forward in their audio-visual usage by revising some of the materials produced earlier under the three special programs noted earlier. They overtly expressed pleasure that these kinds of visuals had enhanced their classroom presentations and intended to expand or revise their original group of visuals. Apparently, the existence of a functioning core curriculum committee was, in effect, an established
mechanism for change which had disappeared since the completion of their task. It is encouraging to note, however, that the color delivery system was adopted by the group as a supplemental tool that furnished them a new additional capability. A spin-off from this original activity became evident when it was discovered that certain members who had not originally planned to use visual materials had begun to develop independent packages outside of the formalized committee structure. These efforts were centered in the fields of Music, Physics, and Biology. Evidently, the institutionalization of the invention into the operational aspect of total campus planning had become a reality. This action alone provided support and continuity to the possibility of on-going support for continued use of the invention.

B. College B

General information furnished about this institution earlier will be supplemented in the same way as treated with College A. Readers will note that this institution is one of the larger members of the consortium and by virtue of its public status is treated as a cooperating institution. Cooperating institution, as defined by the Office of Education under the Title III guidelines, stipulated that this institution did not qualify for direct funding under the total program. This became an unusual opportunity to examine this institution as an even more representative contextual field experience in terms of motivation, because whatever motivation occurred would be more intrinsic in nature. This would result from the fact that discretionary funding did not become a part of the reasoning behind the endorsement to participate.
This institution is one of two coeducational public institutions and includes a graduate division. By virtue of its size and its role in the total scheme of state-wide educational programming, this institution early in its development had established a recognition of the need to provide audio-visual support and service to the entire campus. It also supported the idea that they should develop individual support for professional efforts to improve the quality of their instructional methodology.

This institution is one of the few members of the consortium that has a centrally controlled and highly structured audio-visual program. There is a special area set aside within the total physical plant facility to accommodate this activity. The total effort is supported with both capital equipment and a full complement of staff personnel. Facilities include a technical audio-visual library, a production facility, and laboratory areas devoted to still photography, cinematography, and equipment repair and maintenance. There is a well-developed system for campus distribution of centrally-located audio-visual software items. There are classroom facilities designed to support methods courses that are an integral part of the teacher education program. Summer term activities provide an outlet for in-service training of teachers in audio-visual methodology.

During the initial orientation meeting, at which time the color system was demonstrated, the director for audio-visual services became aware of the possible impact of this unique invention on his campus. He was one of the first to provide an immediate decision to endorse the pro-
ject. By virtue of his staff position, he immediately contracted to receive one of the systems. His plan was to incorporate the system into the production facility under his control. This action was in contrast to College A, which had sought the involvement of the chief academic officer, the audio-visual representative and two departmental chairmen who provided a collective decision-making group.

At the time of endorsement, the writer believed that the size of the faculty and the role and mission of this public institution, along with the centrally-controlled audio-visual departmental activity, would generate a greater amount of faculty participation than could be found on some of the smaller campuses. The professional maturity of the faculty and the financial support available at the institution seem to indicate that this experiment could prove to be the most far-reaching experience of all of the participating campuses.

The director of the audio-visual effort became the second level change agent as did his counterpart functioning on the campus at College A. It might be well to note that the director of this department was a trained and experienced professional. He had one graduate degree and was in the process of completing another. During early discussions with the director, it was discovered that even though there was a recognized and funded department specifically set aside to support creative endeavor, the problems experienced in both colleges were almost identical. The problems on the smaller campus were very much like those of the large campus. For example, both institutions were experiencing the same problems in motivating individual faculty members to utilize new instructional media technology in their classroom setting. Only the degree of im-
portance placed on problems seemed to vary.

The writer was invited to make a campus-wide presentation of the potential of the color delivery system to interested faculty members. Attendance was voluntary. A demonstration was arranged and invitations were distributed through normal campus channels. On the appointed day, some twenty-five professors were present to discover what the color delivery system could do for their individual programs. There were representatives from the physical sciences, the humanities and from teacher education departments. Each had an opportunity to practice developing their own materials, utilizing the invention in the context of their campus setting. The demonstration ended with a request that each professor evaluate the possible use of this new tool in developing an upgraded presentation method that would support the educational objectives of his special area of interest. Each member of the group was able to produce a visual that he determined might be of help and one which was representative of the kinds of materials that he thought could provide supplementary information to his students. The writer was invited to participate as a resource person to the faculty in developing materials specifically designed to enhance their individual efforts. This again was in keeping with the established role that the writer normally assumes as a representative of a consortium. He became a consultant to any interested faculty member as he developed and experimented with the possible uses that could be made of the invention.

Certainly the readers of this work can make the comparison of the kinds of activities that were generated on the two campuses and should be able to reorganize the kind of activities pattern that can be
assumed by the member of a consortium acting as a change agent or innovator. There is no established formula by which a change agent must operate. Instead, it becomes obvious that each cooperating group must be analyzed in terms of its educational objectives, immediate and long range goals, the expertise represented in its total faculty and the administrative procedures that facilitate access to faculty members within the campus setting. With this background information established and declared, let us move to the adoption phase as applied to this institution.

The Adoption Phase.—Unlike the small campus setting described for College A, College B is a relatively large environment in which to operate. The complexity of the organizational structure became apparent since access to a total faculty exposure was not readily available. Secondly, the highly departmentalized, organizational structure meant that there were several intermediate hierarchical layers of personnel both academic and administrative, that had to be worked with to gain access to potential users of the invention. This campus did not have a standing committee that could be assembled to study and facilitate this project.

Instead, the writer relied upon the advice and cooperation of the second level change agent to build access to interested parties. Though this situation was somewhat more difficult in terms of operational programming, it was believed that it represented the kinds of environmental barriers that become a major deterrent to change. Not only was the physical setting larger in size, but it was also more complex within its own structure. The additional burden of state governmental control meant that
certain decisions could not be made at the local level.

The second level change agent, in this case, the Director for Audio-visual Services, performed a follow-up activity with the participants involved at the first demonstration meeting. As a result, five interested faculty members were identified so that individual meetings on a consultant basis could be conducted by the writer. The major fields of endeavor represented by these individuals included the departments of Psychology, Sociology, Education, Physics and the Computer Support Center.

Meetings were held with each departmental chairman to discuss the needs of his department and to plan methods to solve these problems. The chairman for the department of Psychology, for example, was concerned about methods that would permit him to teach multiple sections of Freshman Psychology so that basic concepts could be better understood if visual materials were used to illustrate these concepts. He believed that his first enthusiasm in the first section of the multi-section class was better than that reflected in his fourth section presentation of the same material. He believed the problem was critical and was aware of his own shortcomings in presentation methods as each day progressed.

The chairman was interested in developing a series of visuals to illustrate the psychology of color and a second program to illustrate the characteristics of heredity at birth. During the weeks that followed, the chairman became embroiled in departmental activities to the extent that he did not produce the program he was so enthusiastic to complete. Six months later this same chairman was discussing the things that he wanted to do, but did not seem to have time nor the motivation to become involved.
The chairman from the Humanities Department reflected the same enthusiasm for developing visual materials to supplement the teaching of Shakespeare. He envisioned several kinds of visual presentations that included 16mm film, 35mm slides, flip charts and overhead transparencies to accomplish the task. He met with members of this department and attempted to organize each segment of the visual presentation, utilizing a member of his departmental staff. The writer then became involved with four departmental faculty members within the humanities group. As the program progressed, it became apparent that the enthusiasm of the departmental chairman made little impression upon his colleagues. After three months of preliminary strategy design, each faculty member was attempting to disassociate himself from the program outlined by the chairman. The entire program disintegrated as a result of the lack of commitment of faculty members to upgrade their presentations by using visual materials.

The departmental chairman responsible for the Physical Sciences activity on the campus was familiar with the potential of visual materials and had used three dimensional models, charts, and technical films whenever possible. His first request to develop cartridges of 35mm slides programmed as self-instructional materials was outstanding. He fairly bubbled with enthusiasm until such time as we began to design the educational objectives of the programmed block of instruction and examine the amount of involvement required in planning such a venture. At this point, the chairman tried to enlist the help of his colleagues within the department only to find that they were not as committed, even though they recognized the value of such programmed material. This group also became disenchanted with the production of visual material and the entire
effort failed.

The departmental chairman from the College of Education, who recognized a state-wide need to educate potential teachers in media technology, was perhaps the most enthusiastic endorser of all participants on this campus. He indicated that almost all current textbooks recognized the merits of using visual materials to supplement verbal presentations made in classrooms at the elementary and secondary level. He recognized, too, that within the entire state there was not an organized program at any campus that required methodology courses in instructional media that went beyond the physical threading of projectors, the loading slide cartridges, and the manipulation of portable screens. He was the first to state that here was a possibility for this institution to become a center of excellence in this type of effort. He was, therefore, enthusiastic about the possibility of teaching student teachers to use the color delivery system.

However, this program also collapsed, as did the other three, because the departmental chairman could not find additional help within the department to plan the objectives of the course material. After seven months of meetings, demonstrations, orientation programs, and individualized consultations, the effort was abandoned for the academic year.

In each case, the writer had the support, both physically and financially, of the Director for Audio-visual Support Services. In each case, faculty members could have had a personal staff to help in designing their particular projects and this audio-visual production support was available without cost to the department. The color delivery system
had been demonstrated on several occasions and access to it had been arranged on a seven-days-per-week basis.

The effort on this campus was on the verge of complete collapse, when a group of people discovered the color delivery system by accident. In July, 1966, this institution was granted funding for a Multiple Purpose Training Center to serve the North Central Region of the Office of Economic Opportunity. This region is composed of eleven states: Colorado, Idaho, Iowa, Missouri, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming, and covers over one-third of the land area of the United States.

The purpose of the training center was to help eliminate conditions of poverty in mid-America by furnishing a centralized training facility to furnish in-service training for OEO personnel and for those who became associated with it at the field level. The great distances involved coupled with the fact that this institution is located in one corner of the region would help eliminate the need for trainees traveling great distances to gain access to a center. It was also recognized that the training programs should be responsive to local needs as identified by the regional office of OEO. As of November, 1969, the Multiple Purpose Training Center has provided training for 3,200 persons during the year; and 1,026 of those trainees have been Missouri residents.

The greatest amount of training activity has taken place in Neighborhood Centers and Resident Participation curriculum programs. Field workers and predominantly low-income people are the recipients of these two programs, thus providing a training emphasis wholly consistent
It became apparent that communication between trainees and Multiple Purpose Training Center trainers could be facilitated by the use of a new instructional methodology employed at the training site. The curriculum was designed to de-emphasize the lecture method and to emphasize visual presentations to influence the attitudes of the low-income group. The liberal use of role playing, the case study method and small group discussions of concrete problems, practices and experiences were employed to enhance the learning process.

The involvement of this group on the campus became evident to the writer when one of the professionals employed by the central staff discovered the color delivery system during a demonstration on the campus. This person was charged with the responsibility of developing full color visual materials that could be incorporated into the new curriculum for trainers. First efforts were to develop a 35mm programmed presentation depicting the Black and White communities working in tandem to solve social problems of the inner city. During this involvement, the professional staff person became so involved in the development of the visual materials that she began working with the designer, Mr. Lowe, to improve the pigments in the system, so that they could be adapted to other kinds of projection techniques.

During the next three months, the professional staff member was able to produce and distribute three 35mm programmed slide presentations designed as self-instructional units. She later provided self-instructional units that included slide-tape programs that were distributed to
the field so that local neighborhoods could become involved in the content and the resulting dialogue. Programs were so well received that members of the neighborhood communities began to produce customized visuals designed to influence block neighborhoods in terms of their own particular needs.

It might be pointed out here that the unique facet of this development was the fact that the second level change agent was able to perform in his normal role, utilizing a new piece of equipment in a way that facilitated adoption. In this case, the writer was not involved except at a later stage in the program development. The color delivery system was adopted by a highly-motivated group of people on the campus and it performed as it was designed to do. The fact that unskilled personnel were able to produce high quality full-color visuals at an economical rate proved its utility in terms of a production facility. The fact that the original demonstration proved to be a proper dissemination tool was proven as a valid technique. Even though it took three months to develop program emphasis, there was reinforcement to its value as a result of the original exposure. The original trial program did build the conviction that provided the needed emphasis to move forward on additional programs.

It seems to the writer that the effectiveness and the efficiency that was brought about in operationalizing the system within the campus setting, would validate the objectives set forth in the adoption phase of the model. The fact that they have established the color delivery system as an integral part of the total training package along with its use in on-going programs would indicate that it has now become an institutionalized innovation, as noted in the change model.
C. College C

General information furnished earlier has established this institution as a small, private, religiously-oriented, all-female college. The curriculum is devoted to a typical Liberal Arts program with considerable emphasis on music, art, the dance and the theater. The physical environment is almost a park-like setting adjacent to a major hospital in a small Kansas community.

Before the original orientation meeting, the president of this institution, along with the academic dean, visited the writer for a private showing of the system. Both visitors had an opportunity to produce a visual that they developed, colored and projected on a screen. Each believed that there was a definite need for this type of activity on their campus and in effect, endorsed participation before the formalized meeting noted in Appendix I. So far as campus audio-visual structure is concerned the program is administered by the librarian at that institution.

The program was somewhat limited in terms of equipment and supporting software, but the available equipment was of excellent quality. The librarian, a dynamic young Nun, had become highly motivated to improve the total campus media program during the first year projects sponsored by the consortium. She later attended two national media institutes and had organized a small, but efficient department to service faculty needs. She, as the campus audio-visual representative, became the second level change agent for this program.

At the time of the delivery of the color system to the campus, she reserved the faculty lounge for a formal presentation of the system to the entire faculty. The meeting served a two-fold purpose, since both stages
of the diffusion phase of the model could be serviced. She told them about the invention and its potential use and demonstrated the production process. Here again, each faculty person had an opportunity to produce visual materials designed to serve their special needs and classroom settings.

Again, the interest developed by individual faculty members who could envision using the system to support their own special area of interest, was encouraging. Surveys to identify existing change mechanisms on the campus failed to produce an existing structure to facilitate a formalized program for change. It appeared that task force assignments were made whenever the need arose rather than on a continuing basis.

The Adoption Phase.— The demonstration generated several areas of interest among individual faculty members. The writer played the role of an invited guest of the audio-visual representative and as a result of this function was asked to consult with interested faculty members as they developed individual projects. Each of the faculty members seemed to be impressed with the possibilities of the color delivery system and saw immediate application to some of their particular areas of need.

During subsequent meetings after the demonstration, the writer was able to advise as to the adaptability and feasibility of the system to some of their requests. The Art Historian, for example, was interested in developing line art visuals to depict various elements in design structure. We were able to develop a program that included audio tapes and overhead transparencies along with cartridge 35mm slides to illustrate the seven basic design elements that became common to all schools of art and design. The Director for Teacher Placement brought this entire senior
class into an involvement with the system by asking them to produce color visuals that might fit their student teaching needs. He had intended that they become familiar with various kinds of equipment and techniques that might carry over into their new assignments in public school systems during the next year.

In the field of psychology an instructor produced overhead transparencies with multiple color overlays to illustrate the concept of a conditioned response based on Pavlov's experiment with dogs and hunger pangs. In this instance she was able to produce a series of nine overhead transparencies that showed the cutaway section of the stomach of the animal and the balloon used in the experiment.

It was interesting to observe that the Public Relations Director for the campus saw a possible use for the system in her fund raising activities to the extent that she designed a series of nine 35mm slides to be used with individual donors in an attempt to raise funding for a campus swimming pool. The projects noted here were completed during a four month period and feedback from the participants indicated that they were happy with the system and in some cases, were progressing on other projects on an independent basis. The audio-visual representative was elated over the fact that this activity was occurring on her campus and that even though they did not have a graphic artist, the system seemed to fill the void.

An encouraging outgrowth of these individual programs was the fact that individual faculty members built upon the success of their colleagues and experimented in other areas of specialization. For instance, two music professors, using the system, developed overhead transparencies and overlays to illustrate various musical movements for their students. An in-
structor in the field of history began to produce maps which were com-
mercially unavailable to her, but which could be produced as customized
materials using the color system. The initial projects were completed
and in each case the professor expressed pleasure at the results and be-
lieved the students enjoyed the presentation much more than had they used
a traditional lecture method.

We were not able to establish any kind of change mechanism on the
campus that would permit change to regenerate itself on a permanent basis.
Individuals continued to produce their own visual materials, while the
color system provided the opportunity for production.

D. College D

As noted in the general information furnished earlier in this
chapter, College D is the largest of all of the participants. It is a
state-assisted institution that became a part of the state-wide system
after having been a specialized teachers college before becoming a part
of the state network. In terms of audio-visual resources, this campus
has the most highly developed learning resources center of the entire
consortium membership. They have developed a fully staffed, specialized
department which includes closed-circuit television, a full graphics sup-
port department, a 1500 film library, long and short-range loan programs
for audio-visual equipment, a recurring physical inventory procedure and
a distributing system for software that surpasses any campus within the
consortium.

At the orientation program, noted in Appendix I, the Director of
Learning Resources Center committed his campus to receive one of the color
delivery systems and to participate in the program. During later meet-
ings with the Director, the writer was invited, along with Mr. Lowe, to
make a presentation to the entire staff of the center. Each staff mem-
ber produced visuals that related to his particular area of interest and
each overtly endorsed the feasibility of using the system as a campus re-
source. There was specific interest in producing customized visuals for
the closed-circuit television programming then being developed in the
area of teacher education and included total teaching using this medium.

During the four months used as an evaluation period on this cam-
pus, only a few visuals were produced for the television medium. Per-
sonal visitations indicated that the visuals produced were accurate in
terms of tone and performed the function designed into them. There was
no hesitancy on the part of users to verify that the color system was a
convenient tool to use and that it eliminated the cost factor associated
with customized visuals produced outside the campus.

The writer learned that the Director of the Center had delegated
the supervision of this system to his graphic artist. This proved to be
a barrier to its use. As we discussed earlier, the system was designed
for persons untrained in the graphics field. The artist viewed the syste
as a possible replacement for his talents and minimized its use to the ex-
tent that programs were not developed on this campus. The writer apprais
the Director of his observations; however, he chose not to make a re-
assignment of the system to another staff member. Consequently, the camp
that could have made the greatest use of the system produced nothing of
substance.
There had not been an opportunity for a trial period for faculty personnel; consequently, the installation and institutionalization stages of the adoption phase of the change process could not be accomplished.

Summary of the Chapter

This chapter reported the methods and procedures used to conduct this project and to describe the pilot programs generated on each participating campus. Each element of the project has been described along with the rationale for its inclusion. Throughout this effort, the writer has tried to maintain an awareness for the reader of the delicate balance between his role as a functioning consortium staff member operating as a change agent within the context of the change model and his role as an outside observer to the project. It is hoped that readers can view this project as an operating change mechanism charged with the responsibility of establishing other change mechanisms among member institutions. In both instances, the model for change has been applied to the consortium role as well as to the member institutions.

In subsequent chapters, the writer will provide an analysis of his findings as a result of these on-campus activities. It might be well to point out that the adoption phase of each project was highlighted because the actual trial programs and pilot efforts took place within the adoption phase of the model. They have been treated in such a way as to be recognized as a part of the consortium utilization of the change model rather than the implementation phase performed as a second level activity conducted by the change agents operating at the campus level.
As we move to an analysis of the program findings, it might be well to summarize as follows:

1. The consortium role, as described here, is in keeping with the established on-going functions normally carried out by professional staff members.

2. The only difference in the approach described here has been to follow a structured application of a recognized model for change to the normal consortium activity.

3. The color delivery system as an invention has become a part of an even more complex invention, in that the consortium itself has become the invention to be evaluated as a facilitator for change.

4. The target system has become subdivided to include not only the institutions and the second level change agents, but is further subdivided again to include the potential practitioners who could use the color delivery system.

Finally, it must be recognized that although the invention was shown to be effective, promising and workable, the writer was still faced with the unanswered question as to why regular college teachers did not visualize some of their presentations. Certainly the model offered a logical and structured scheme to follow. Campus involvement had been endorsed by credible sources and the second level change agents performed in their regularly assigned tasks. The consortium, established to serve the role of an agency for change, performed in a normal manner. However,
adoption was sporadic and still centered around highly motivated instructors who would probably have become involved in innovative practices anyway.

Could it be that the traditional lecture method, using words only, is so ingrained, so relatively easy to do, that the more laborious method of developing instructional systems—using a wide variety of relevant materials—will not be adopted?

The writer recognized that certain intervening variables prevented the total institutionalization of the invention. Some of these barriers include the following:

1. The low level of administrative sophistication in developing instructional strategies to bring about desired behavioral changes prevented the personal involvement of local campus administrators from influencing the adoption process.

2. The degree of commitment diminished with involvement. This was evident on the part of certain administrators and faculty members alike. Initial verbal commitment was not replaced by mental and physical involvement with the color delivery system.

3. There were neither rewards nor penalties from the administration or from peer groups for participation in improved classroom presentations. Motivation, therefore, diminished when the novelty of preparation became a routine production task.
4. Some administrators who furnished leadership for the consortium could not deliver the same leadership on their respective campuses. This seems to be due, in part, to the hierarchical structure of most institutions of higher education. Administrators appear to make decisions based on consensus rather than asserting a more direct leadership that permits participative management to take place.

5. The element of time appears to have been a major deterrent to greater involvement. Instructors on these small college campuses carry a full academic teaching load of fifteen hours or more, plus the normal committee work associated with any campus. Most are required to serve as advisers to various student groups as well as program advisers for the general student population.
CHAPTER IV

AN ANALYSIS OF THE FINDINGS

Introduction

The writer believes that educators have long believed themselves qualified to specify the broad objectives of an instructional program, but the means of achieving these objectives have often proved to be elusive. This study does not challenge the validity of the first part of this stated opinion, but rather furnishes information that might help eliminate the elusiveness, noted in the second portion of the statement.

The preceding chapters have described an attempt to discover a means of achieving an educational objective in a realistic contextual setting in higher education. Perhaps it would have been simpler to replicate the traditional quantitative experimental studies reported so often in professional technical journals, but the writer cannot be satisfied with these findings. There must be more reported as to "how" innovations are adopted in situations so diverse, so as to allow all the forces which play upon adoption to be present to influence the results.

This chapter aims to analyze the results of this project as events did or did not happen according to a structured plan.

An Analysis of the Design Strategy

One might maintain that the project did not have a designed strategy in terms of controlled variables, stratified samples, or recorded data supported by standardized forms. Some might be more com-
fortable with recognizable distribution curves or tables and charts that would measure precisely the significant differences drawn from such an effort. None of these will be found as a part of this study. Why? The reason is simple to state—this is not the way change takes place naturally in the context of an institutional setting.

The simple truth underlying this entire effort has been to develop operational guidelines for a new trend in higher education and one that has not been in existence long enough to have developed, recognized, and accepted guidelines of its own.

The writer is a practitioner operating as a change agent within an established consortium effort. The answers sought in this study have been a result of his effort to dispel the intuitiveness associated with having to function without guidelines.

One will recall that as an instructional media specialist employed by a consortium, the function to be performed was one of attempting to improve the quality of education on member campuses through better utilization of new instructional media technology. Problems identified on each campus require a solution and this, in turn, calls for a structured methodology to bring about a change in existing behavioral patterns within a particular target system.

The problems detailed in Chapter I were not subject to debate. They were valid and identifiable on each of the campuses. During the nineteen months devoted to this project, the need for a solution to these problems was reinforced on numerous occasions and to a large degree the need continues to exist today.

The writer was faced with a need to know what activities are re-
quired to bring about a change in institutional behavioral patterns. Furthermore, he needed a structured systems approach to the solution, so that he would know when milestone events took place in the change process. It might be well to point out that this structured approach was intended and directed toward a deliberate process for change that became a planned activity. The writer hoped that planned changes could be implemented because of the quality of the relationship between the writer, functioning as a change agent, and the target system. It was further intended that the target system would not view the writer as having a solution to a problem that he must get across. Instead, there was a desire to have the campus participants accept the change agent as one who does have specialized, valid knowledge about new media technology, and would serve as a consultant to them. It was, therefore, imperative that any model selected to implement a change process permit the writer to serve as a change agent without compromising the local change agent in the cooperating group.

Certainly it would have been a perilous task to categorize the myriad approaches that could have been followed in studying change and the attempts to bring about change. It seemed that all models examined were constructed to service the practitioners of change as well as to advance the science of change. The justification for the selection of the model used in this study was made evident in Chapter I, along with a detailed interpretation of each element of the model. It seemed to fulfill a kind of diagnostic framework to meet the action to be taken by the writer as a change agent, which is somewhat different from the theory of change noted in other models.

The seven months devoted to independent developmental activity
with the designer of the color delivery system, adapted for this specific study, might be looked upon by some as needless effort. This system, however, was being developed as a problem-solving device which was a normal function of the writer in his proper role as a professional staff member of the consortium. The fact that it was a proven product at the time of the project implementation on the campuses was incidental perhaps, but the personal involvement in the development provided a credibility to using it as an invention appropriate to meet campus needs.

Administrative pressures and the policy that only volunteers should be used in instructional media experimentation are serious sources of sampling bias, noted by the writer in most media research. Indeed, this possibility was evident even before the memorandum (Appendix I) was distributed. There was a possibility that none of the membership would be interested in the project or that those who expressed a desire to participate would not represent a sample of the variety of institutions available.

The writer was soliciting involvement because a consortium exists and operates by invitation. It is true that creative initiative on the part of the central staff can stage events and sometimes force changes to take place, but this is not in keeping with the intent and purpose of the consortium. The idea of permitting the project to develop in a normal manner afforded an opportunity to report about and later evaluate the effectiveness of the consortium role as a catalyst to bring about change.

The response to the proposed program set forth in Appendix I and described in Chapter III provided a reinforcement to the problem identi-
fication made by the writer, as being consortium-wide and was a salient issue to be contended with. The participants were volunteers. They represented our largest institution and included one of the smallest. The sample included two, state-assisted institutions and two, private colleges. Three of the four were coeducational and one was all female. The faculty members on the four campuses totaled 1,129, a figure that provided more than a 40 percent exposure of the collective consortium faculty strength to the program.

In terms of applying the change model to the project, it was recognized that each campus would have to be treated separately in order to allow for individual institutional differences. The descriptions of each campus program, provided in Chapter III, take into account the contextual setting into which the invention was placed.

Although each college performed in every phase of the model structure, the trial programs noted were conducted in the Adoption Phase. Attempts were made to show that the model was being applied in three overlapping programs and each was a separate and distinct activity.

The writer would, therefore, contend that the project did have a designed strategy for implementation. The intent was to influence the introduction of an invention into a specific contextual setting. The emphasis was to change the internal behavior of each institution by providing a possible solution to a recognized problem in such a way as to be natural, yet directed as a planned change. The change process could be observed by using a recognized model, designed to structure the change process in a way that each element could be recognized by the change agent. The change mechanism was a reality and an on-going activity. The invention was a
field-tested device designed for the specific target system involved. These elements were all applied in this study with the degree of success, noted in Chapter III.

An Analysis of the Color Delivery System

Early in this work, the writer described some of the basic background information that explained the reasons for the development of the color delivery system designed for this project. There was no attempt to delve into the basic research that was used to perfect the system. Instead, readers were made aware of the reasons why it was developed. The personal investigations made by the writer to determine the validity of its use became more important to this project than the way that it was developed. The parallel between the visual production problems of a commercial television station and the visual production problems faced by institutions of higher education provided enough reason to adopt the commercial system to meet the needs of education.

During the seven months that the writer worked with the designer and the manufacturer of this system, he had access to the research data that supported the objective noted in our change model in terms of advancing knowledge. Certainly its relation to change could be seen daily in the color visuals that were being used successfully by commercial television stations. The writer did not have a reason to challenge the fact that a new solution to an operating problem had been brought about. Truly, the inventor had produced an invention. He had been able to engineer a transportable package applicable to problem solving at different stations throughout the nation.
The problem faced by both the designer and the writer in this project was to determine whether a color delivery system that could be used in a commercial operation could also be redesigned and adapted to the needs of a classroom teacher. There was no question as to the need for such a device among the consortium members within the region. Personal past-related experience with administrators and faculty members supported the notion that access to customized visual materials influenced greatly the number of visual presentations that were made in classrooms on member campuses.

During the entire project, very little space has been devoted to describing the mechanical process by which color visual materials are produced. It seemed to the writer that the color delivery system, as an invention, became a part of the change process being studied here and details of this nature would be superfluous, except as they became barriers to using the invention. During all demonstrations and during the trial programs attempted on each campus, the color delivery system performed in terms of the design factors set forth by the writer and those suggested by the manufacturer in terms of the specially designed package.

The visual materials developed by the instructors at the various campus sites were used for art originals that became transformed into classroom visuals, including overhead transparencies, 35mm slides, animation cells for an 8mm film, and in many cases, were used as flip-chart materials in their original art form. Storage of the art original has not posed a problem on any campus and the quality of the stored original has remained in excellent condition. It is, therefore, the contention of
the writer that the color delivery system performed in all aspects of the
design parameters established as criteria for its development.

It might be of interest to readers of this study to note that
since this project was begun many school systems and colleges throughout
the country have purchased the simplified system used in this program.
Feedback through the supplier and sample visuals have indicated that they,
too, are experiencing the same success in terms of production capabilities
and capacities.

An Analysis of the Change Process Model

The writer devoted considerable effort in Chapter I to a descrip-
tion of the rationale used in choosing the Guba-Clark scheme to bring a-
bout innovation and change among the developing institutions within the
consortium setting. In this chapter, the effort will be directed toward
analyzing the results of implementing this scheme for change in an actual
contextual field study. The writer will examine each phase of the model
as it applied to the campus programs and will attempt to detail the ex-
periences associated with it.

University archives doubtless contain the works of experts who
have written extensively on theories, paradigms, models, and systems de-
digned to bring about change. The writer could have spent much time at-
 tempting to sift and sort the many approaches that could have been used
in this study. Instead, he adopted a model for change that has been ac-
cepted and endorsed by the United States Office of Education and dissem-
inated for possible use by recognized change agents throughout the coun-
try. The use of this model was not taken as a means to expedite this
project. Rather, the writer decided that it would be proper to attempt
to use an endorsed scheme to bring about change within the consortium.
The program on which the writer embarked was not to discover a new theory
for bringing about change, but instead to trace the movement of an inven-
tion through institutions of higher education using this recognized struc-
tured scheme to study the process by which change takes place.

Before accepting the model at face value, the writer had to de-
termine its feasibility in terms of predetermined standards. Without
these standards it was believed that its application would not succeed in
the context of the consortium setting.

Answers to the following questions helped build conviction in the
possible validity of the model and were used in examining several alter-
native schemes.

1. Does the model provide for the mutual recognition
   of the special roles of both the change agent and
   the target system? Does it take into account the
differences between a change agent with certain
   technical competencies and the target system with
   its values, perceptions, and its right to self-
determination?

2. Does the model provide a reliable basis for diag-
nosing the strengths and weaknesses of the conditions
   confronting the target system? This is especially
   applicable to a flexibility factor needed in a con-
   sortium setting.
3. Can the elements of the model be communicated to the target system without destroying its basis of effectiveness? Past related experience would indicate that this target system would resist any plan that would place the consortium in higher esteem than the institution, in the eyes of the local faculty.

4. Does the model provide its own criteria for assessing when it is applicable or not? Since the consortium setting affords many ways of changing, it was believed that the change agent and the target system should benefit from the greatest flexibility so that the model could serve the widest variety of actual conditions found in the field.

5. Since change and its many processes occur over a varied time span, it is important to know if the model defines a specific period required for a continuing relationship between the change agent and the target system. How involved does the change agent become with the problems of reaction, anxiety, obstacles, and the new adopters developed? This set of questions became very important because priorities are constantly shifting within a consortium membership. It is a rare instance when one finds the majority of members working in tandem on similar priorities.
6. Finally, the writer had to know if the model would provide the change agent with the means of affecting the direction and quality of the process of change. The value of this flexibility is reflected in each campus program and is paramount to maintaining relationships within a consortium setting.

It is fully recognized that a model is a means to provide guidelines for programming actions to bring about change. However, the questions applied to the model were important because rigid limitations to any of these categories would have compromised the possibility of bringing about change in this setting in a natural and convenient way. In effect, without the flexibility to operate freely and still work within the structural framework of the model, the consortium environment would have become manipulated to an unreal situation. It may be that this lack of flexibility afforded in other models for change is one of the reasons why the national consortia effort has not been able to develop more valid operating guidelines.

The Research Phase

Perhaps the most important phase of the model application took place in the Research Phase. However, the description of the activities related to it have been expressed throughout this entire effort. As noted in Chapter I, this category has but one objective: "to advance knowledge." It would therefore be considered redundant to relate again those reasons for the statement of the problem, the research and development activities associated with the color delivery system and the model selection process.
If we can subscribe to the premise that normal research activities include descriptions, comparison, and conceptualizations, let the earlier descriptive information stand as representative actions, taken by the writer as he performed in this area. These activities are normal planning functions that would be performed in any recognized sequence of problem solving.

One might require further proof of the internal validity criterion used in gathering basic data on each campus. Perhaps the most relevant evidence could be interpreted from the fact that the initial proposal to fund an audio-visual program, was based on the consensus that member institutions should use new media technology to improve the quality of instruction. The identifiable problems defined by the writer in Chapter I became those that resulted from this initial effort. The external validity of these early findings was generalizable to the target system since personal observations made by the writer reinforced the declared problem areas.

One might raise questions in relation to the problems noted and even raise questions of significance, but this only serves to illustrate the point that research must be assessed in its own terms. Much of the fundamental information was gathered prior to the effort noted in these pages. The daily routine of working with the campuses had provided written, verbal, and visual evidence that placed the writer in the role of a specialist in these matters.

Assuming that these paragraphs can be accepted and that the approach, though not purely scientific, was valid, it seems logical that
the generalizations made by the writer in Chapter I provided a basis for invention. Certainly the operating problem was real and the campuses were looking to the consortium for help in solving the problem.

The writer would analyze the Research Phase as the one part of the model most difficult around which to draw hard and fast lines, especially with regard to this project. Much of the fundamental research was based on tabulating past personal experiences on each campus or using recall to interpret face-to-face conversations with faculty members and administrators, listening to students, reading course catalogues, campus newspapers, and published minutes of meetings.

Earlier exposure to television production and the first demonstration of the color delivery system was not a formalized effort to gather research for this project. Here again, these were but pieces of general information that were gathered simultaneously, but without a central focus. They were bits of stored information available to the writer, but had not been combined in any fashion until this project was begun.

The writer wishes to make it clear that the introduction of the color program was carried out not as an activity of a researcher from the outside, but in the same way as other innovative projects would be carried out in a consortium setting. It had to be customized to fit the interests and concerns of professors.

It would seem proper to assume, however, that a person discovering the model for the first time and who did not have an immediate problem to solve, could map a more formalized research effort as part of his model application. Certainly the writer sought a model for a structured
approach with two purposes in mind. The engineered solution to the cam­

pus problem became a support activity to the primary concern of identify­

ing the role of a consortium, serving as a change agent in higher educa­

tion. This may have compromised the total project somewhat in terms of

sequence, but it would not alter the placement of the research activity

on the model continuum.

The Development Phase

According to the model classification, this phase has two direct

stages, one Invention, and the other Design. The stated objective in the

Invention Stage is to formulate a new solution to an operating problem or

a class of operating problems.

In terms of this project, the operating problems were well de­

fined and identifiable on all campuses. The writer was aware of the

understaffing problems and the underfinanced status of member institutions.

One of the change theories discovered and recognized by most is centered

around money. A widespread procedure for inducing change is that of pro­

viding benefits for those target systems engaging in action desired by

the change agent. Special money, grants, allowances, and benefits have

long been a part of programs for change and have been supported by govern­

ments, foundations, and industry. The writer is a part of just such a

group, funded under Title III of the Higher Education Act. There is not,

however, a discretionary fund that could be applied to the solution of

this problem. There is still a question as to whether a full graphics

production department for each college would be utilized to improve the

use of instructional media in the classrooms. Without budget and fiscal
opportunities available, it became evident that an engineered solution had to be developed.

Using the criteria of appropriateness, viability, and impact noted in the model as prerequisites, the writer aimed to produce an invention. It was here that the stored information noted under the Research Phase became usable. The color delivery system became an appropriate invention in itself, provided it could be made available and redesigned to fit a classroom environment. Certainly the cost-free proposition made by the designer would qualify it as a viable possibility, since this barrier to usage was eliminated. If it could be used in classrooms by persons unskilled in the graphics field and if the customized software served the intended purpose, the impact at the classroom level could be striking.

The added feature of a consortium, as an appropriate change mechanism already established as a viable on-going agency, offered a ready-made delivery system that had already proven itself to member campuses as providing impact at the classroom level.

With these elements established as basic, accepted and placed into the model framework, the writer was able to analyze each campus audience or target system in these terms. He attempted to engineer the program for each participant just as though he might have been a member of the campus staff. In each case, however, there was a keen awareness of the advantages of being an outside influence and this eliminated many subjective decisions that plague the movement of an idea developed and carried on from inside the hierarchy.

Early in this program it became apparent that the roles of innovators, donors, and acceptors of change are neither incidental nor co-
incidental in the educational scheme. Certainly, operating in an age of planned or managed change can, with respect to all three agents of change, leave precious little to chance. It was, therefore, imperative that each program be customized to the particular campus environment with special emphasis placed on the local communication network, the political scene, and the ability of each cooperating group to receive the intended message. It became obvious that their roles could not be limited or standardized for all four participating campuses.

Furthermore, past related experience in consortium work had established that the progress of any innovation or invention must be examined in relationship to a complex network of groups, individuals, and organizations having a stake in the innovation. The professional, political, and economical context of an education organizational operation must be considered when the innovations are being studied or attempted. Inter-institutional power struggles are probably inevitable in the installation of any substantial innovation and may become more important than the innovation as such.

It was also believed by the writer, that the spread of an innovation could be retarded if a potential user regarded it as familiar, or as being only a slightly different version of an existing procedure or practice. Thus, it would not be worth the extra effort required to shift to it. However, an innovation regarded as a means of reducing a well known or familiar gap between ideas and practice might achieve adoption, particularly if the gap was genuine and a keenly felt one. This same past related experience seemed to support the notion that educational innovations are almost never installed on their merits. Characteristics of
the local system, the innovating group, and other relevant groups often outweigh the impact of the innovation. It might also be pointed out that technological innovations can be relatively easy to adopt. It is just as important to remember, however, that such innovations are equally easy to reject or discontinue.

One will note that the invention developed to solve the visual production problems—namely, the color delivery system had become just one element to be considered in moving it through the individual adopting group. The issues noted above are more important considerations in the invention and design stages than the color delivery device itself. It becomes apparent in this Development Phase that the barriers to implementation and adoption are not hardware oriented but are a part of a social activity.

Another major element considered in engineering a program for each participant was the need to evaluate the entry behavior level for each campus as applied to the model. Some were well organized to carry out the program, while others were unorganized and less sophisticated in systems orientation. However, there was one common denominator that did exist for all participants. Each had a well defined organizational structure that, in theory at least, placed major campus decision-making responsibilities at the presidential level. The president might, in turn, delegate the authority to decide to the academic dean or the departmental chairmen, but the initial contact was made at the presidential level.

It was at this point in the design engineering process that the writer sought to enlist the support of the most credible campus officer
to endorse the program for his campus. It was believed that commitment at the highest level would build better motivation, whether intrinsic or extrinsic, to bring about faculty involvement with each project. This action also supported an observation that in this consortium, major instructional innovations are introduced by administrators, not by instructors. The administrator is powerful because he can marshal the necessary authority, if not the personal leadership, to precipitate a decision. He may not be, and in this project was not, the original source of interest in a new and innovative program, but it was believed that unless he gave it his attention and actively promoted it, it would not be adopted on his campus.

It was further recognized that regardless of the level of endorsement, there would be a need to develop second level change agents on each campus to serve as a catalyst for participating faculty members who were interested in using the invention. It was here, that each audiovisual program representative became the important link to the true target system for the project—namely the individual faculty member. They were to be the source of change for the local campus in terms of being adopters. Even though the campus hierarch would eventually be responsible for helping to institutionalize local change mechanisms, it was the faculty use of the color delivery system that would reinforce the need to establish them. Perhaps it is here, too, that readers will find the justification for the approach used in examining media research in teacher education in Chapter II, rather than studies devoted to media impact or its effects.

Thus, the Development Phase of the model provided the opportunity to follow the structure in determining the appropriateness of the various
elements of the educational context as noted in the above paragraphs.

With these considerations established as components of the invented solution, the writer developed or engineered the following package to be applied in the Diffusion Phase:

1. Seek endorsement and commitment for program involvement at the highest administrative level.
2. Establish local change agents to serve as a catalyst for individual faculty members desirous of using the color delivery system.
3. Develop customized programs for each campus, depending on the level of sophistication, motivation, the declared need, and the ability to perform.

The Diffusion Phase

The model has divided the Diffusion Phase into two distinct stages. One activity is concerned with Dissemination, while the other is devoted to Demonstration. The dissemination stage has a stated objective of creating widespread awareness of the invention among practitioners. The action to take place here has been "to inform" about the invention.

The objective set forth in the demonstration stage is to do exactly that—namely, to supply the opportunity to examine and assess the operating qualities of the invention. The desired terminal behavior is to build conviction among potential users of the invention.

In the dissemination stage, the writer applied the three design objectives of institutional feasibility, generalizability and performance, noted under the Development Phase, to implement the project on each
campus. Since the consortium activities provide access to all levels of each local academic community, it was not difficult to select the specific audiences desired within each campus setting.

Face-to-face meetings are relatively easy to arrange as this is a normal procedure used by consortia to conduct their business. For this reason, the writer issued the memorandum noted in Appendix I. Distribution of the request to discuss the program was made to all presidents, academic deans, and audiovisual representatives on all member campuses. The response noted in Chapter III was normal and in keeping with meetings held for other consortium projects.

The purpose, as stated earlier, was to inform each campus about the invention, to seek involvement and commitment and to demonstrate the invention. It was hoped that the entire orientation would be ordinary and normal. Experience has shown that anything that an observer might label as strikingly different or unrealistic would be sufficient to rob the observed program of any persuasive effect.

Each college was furnished a presentation of the identifiable problems, alternatives, and possible solutions. The presentation was planned against the criteria set forth in the model and results were evaluated in response and commitment. Considerable effort was given to persuasiveness in that both written, verbal, and visual information was geared to the level of sophistication of individual participants with applicable examples directed to each campus. This move appeared to help each relate the system to his or her own campus environment.

The demonstration of the system was designed to bring about interaction between the demonstrator of the system and the cooperating group
representatives. It furnished them the opportunity to examine each step of the operation and later each produced a finished visual to be retained as an example of the end-item produced. They were shown the ease with which they, as unskilled graphics people, could use existing materials to produce customized material applicable to classroom use. The convenience of the portable system, its specially designed timing devices and its adaptability to a variety of projection methods seemed to build the desired conviction in its potential as a problem-solving device.

This phase of the model furnished a unique opportunity to study the kinds and or types of advocates of change within the key target system. There were early adopters, mid-point or conservative adopters and several who might be considered laggards so far as possible change activities are concerned. One could almost parallel the change studies made by rural sociologists in terms of adopting new methods. The hybrid corn had been replaced by the color delivery system, but the reactions were similar.

It is interesting to note that the two early adopters who were able to make an immediate commitment were from colleges B and D. Programs utilizing the color delivery system on their campuses noted in Chapter III were the least effective of the entire group.

In attempting to evaluate this phase of the model and its application to this project, the writer would hasten to caution anyone to spend considerable time and effort on audience analysis. The complexities in motivation, role playing, malassignment, "gatekeeper" status and the effort of the unintended audience can play havoc with this activity.
For example, presidents serving in their capacity as a chief administrative officer for a campus may be willing and able to commit the institution to a program, but lack the power or structure to facilitate change. The writer was aware of this possibility and had to assess commitment in terms of the change agent being able to use this mandate rather than depending on the leadership offered by the president.

It is well to remember also that even prior to the point of adoption or rejection at the demonstration stage, many problems occur during the hardware development.

Relatively small technical decisions may have a strongly deterrent effect on the development of a particular device and the opinions of a relatively small technological elite, can exert disproportionate influence. In addition, devices which rely on associated material such as film projectors may be hampered by a "chicken or egg" problem. Since producers of materials are reluctant to produce them if no device for using them exists, then the producers of the device are reluctant to proceed in the absence of available materials.

Software materials aid the diffusion of educational innovations considerably. The reasons for this seem to be the relative degree of ease with which they can be designed and altered to fit the demands of classroom situations, their ease of reproduction and distribution, and their retention of substantial integrity when used by a wide variety of teachers in different situations.

This phase of the model made it perfectly clear that the motivational reactions of potential users aside from the difficulty of use or
implementation of a particular invention are a genuine barrier to adoption and continued use. Although complexity or simplicity of the invention as such, may not necessarily influence adoption rates in a different way, it does seem likely that inventions will diffuse slowly if they are difficult to operate—that is, require extra administrative energy, are disruptive to the local system, or are puzzling or threatening in a technical sense. Thus, the potential use of technical inventions in the classroom depends on a number of anticipated implementation factors, such as availability of the device, ease of use, working condition of the equipment and above all authorization from the local organization to use it.

The Adoption Phase

Developers of the model have chosen to divide this phase of the change scheme into three stages of progression. They are the Trial Stage, the Installation Stage, and the final stage—Institutionalization.

Individual campus pilot production programs were all conducted under the Trial Stage and will be analyzed under a separate heading later in this work.

One will note that the objective of the Trial Stage was to furnish the opportunity for potential users of the invention to build a familiarity with it. Here they could develop a basis for assessing the quality, value, fit, and utility of the device to their particular institutional setting. In effect, the invention, the color delivery system, would undergo the desired contextual field testing at this stage of the project. This seems to be the objective of almost all persuasive efforts and applies to
business, commerce, heavy industry and certainly must be applicable to education as well.

This procedure aimed to test the invention in terms of its feasibility and adaptability to solving visual production problems within the context of particular educational situations. The influence of the characteristics on each local campus could be brought to bear on the invention during this activity. Determinations could be made as to whether or not the redesigned system had been "watered down" so that it was no longer appropriate and efficient and whether or not the capacity to furnish enough flexibility to support end item use had been compromised.

These pilot programs could also furnish possible answers to determine the feasibility of the redesigned system to be adapted to the local campus environment. Answers could be gained as to how the system functioned or acted under real situations. Here could be determined the skill level required of potential users and whether or not the design objectives noted in Chapters I and III had been met. It was further hoped that the actions and experiences of the trial program participants would persuade reluctant colleagues to become interested and subsequent adopters of the invention.

It was hoped that in this stage, the writer could assess whether changes in operating performance within the target system were only temporary shifts in the system behavior and further, whether or not the desired change in structural or operational mode had been made in terms of restructuring the target system.

Certainly temporary changes could be considered as only oscilla-
tions in relationships within the target system and not permanent. Even though the reaction could be reported as real and valid, it could also provide an unreal situation because the adoptors would return to a "status quo" state when the programs were completed. The study was designed to support the notion that changes would be permanent and would lead to modifications and reorganizations within the target system that would restructure institutional behavioral patterns.

It was hoped that the target system involved could be raised to a level of critical evaluation so that they were not willing to accept any invention that comes their way, but instead would make a value choice while testing the color delivery system. It was also a desire not merely to create a situation that raised target system expectations with the hope that acceptance would be automatic, but rather to establish a collective value judgment that the change was desirable as a long-range plan or procedure.

It is in this phase of the model that potential users of the scheme can determine the degree of change agent leadership to be invoked with the particular target system involved, so that potential adopters view change as having been generated from within the system rather than outside the group. This is especially important in consortium efforts where institutional growth must be recognized as a primary long range goal. The writer believes that a consortium, presenting a low-key silhouette in change implementation, will help individuals within the target system develop change mechanisms that they themselves value rather than perceiving themselves as dependent on outside expertise to produce growth.
Such efforts will permit the outside change agent to become instrumental in providing some incentive and leadership, but not to the extent that the target system cannot identify and develop its own definition of needs.

This stage of the model afforded a climate conducive to acceptance of the invention through total involvement by members of the target system. Each participant, through color delivery system usage, became a practitioner able to assess the value and utility of the invention in the context of his own campus. Thus, this stage of the model, if recognized in the proper sequence of the change process, could determine the compatibility and feasibility of possible adoption on the local campus.

Some difficulty was encountered by the writer in this stage of the model in not being able to provide a standardized approach, even for members of a consortium whose common bond of association and familiarity should have been counted as an asset. Instead, each college became a separate audience with measurable, but different dimensions and priorities. This same problem would most probably become evident to a consolidated school district curriculum supervisor or a media specialist on a main campus, attempting to innovate on satellite campuses within a statewide system.

Carrying this same thought to a principal within a single school plant unit, each instructor within the same building becomes a complex target system within himself. Certainly this realization must be taken into consideration at all phases of the change process, if the engineered solution is to have any chance of succeeding. This stage of the model is where trial or pilot effort takes place and should be used to apply the
best total planning effort developed in each of the preceding phases and stages of the model.

It is in this stage of the model that the change agent can begin to predict and evaluate feedback in terms of possible adoption or rejection of an invention based on actual contextual field experiences. Endorsement and commitment take on a real profile at this stage of the program development. Change agents can begin to assess the overt and covert realities of involvement and dedication to change during these activities. One can begin to judge the validity of his implementation strategy in measurable terms. He has the opportunity in this stage of the program to adjust the strategy to strengthen it or revamp it completely, if total failure becomes evident. Weaknesses in invention research and design efforts will become apparent as well as in project emphasis and implementation strategy.

During trial period efforts the change agent has the opportunity to assess his role in tangible terms, with regard to reducing the risk required of the trial participants in accepting an invention. He can control the rate of adoption so that elements of change will be introduced in a way that will cause the least amount of disruption to the environment. In this way he continues to facilitate change processes, but helps eliminate inevitable resistance factors that would impede adoption of the invention.

Readers will note that in this stage the role of the change agent takes on a somewhat drastic change. To the point of the trial efforts, the change agent is more of a declared aggressive initiator of change,
where as in the trial stage he becomes a facilitator, operating at a low-keyed consultative level. It was here, in this project, that the key second-level change agents in residence on each campus assumed their proper role as initiators who advocated and supported the adoption of the invention.

The writer cannot stress this technique enough as related to consortium work. During his tenure of employment in this area, an acute awareness has been developed of the need to recognize that "educators resent being taught." Consequently, this technique of working as an invited consultant has proven to be an effective and efficient method to be employed in attempting to bring about change. It seems to eliminate the challenge to local faculty status and reduces the possibility of becoming a threat to their expertise as a scholar and an academician.

With regard to initiating the pilot or trial programs themselves, this stage proved to be quite complex. It became evident that impatience on the part of either the consortium change agent or the second-level change agent could prove to be disastrous. Indifference could have the same results.

Leadership and perceptiveness in this stage must, therefore, be exercised with precise skill. If a change agent is suspected of manipulating the campus group, there would be a tendency to reject him and he would not be effective or even accepted as an outside resource to be utilized by them. On the other hand, there seems to be greater acceptance of a more democratic leadership that recognizes a decision-making role for the change agent, and which provides for collective decision-making
from participants within the target system. In this way, it is logical to assume that leadership of this nature provides the change agent with the opportunity both to direct activities and at the same time to initiate direction from within the target system. This type of leadership would be essential in consortium efforts. In attempting to analyze Trial Stage activities, as they influenced and functioned for this study, one must recognize that this is the one part of the entire change scheme in which the change agent role varies and is subject to change quickly. In terms of consortium efforts, it becomes even more critical because of the uniqueness of collective action and the differences observed in member institutional goals and organizational structure.

The invention itself must be perceived as a different entity on each campus and must be flexible enough to be adaptable to meet contextual requirements. One will note again that the invention, although important as the problem-solving device, has played a very insignificant role in terms of developing the change process. True, it is a focal point for project development and is a necessary ingredient in the total scheme of things, but its adoption is based on and influenced more by a social process rather than by its intrinsic value and worth as a problem-solving device.

Although the campus projects were developed around the color delivery system as an invention, it is hoped that readers will recognize that the consortium as a vehicle for change differs from the invention as a vehicle for change. Both the color delivery system and the consortium are, therefore, inventions. Both are delivery systems and both
perform simultaneously within the framework of the model for change. Furthermore, they work in tandem to influence the behavior of the same target system and both are directed by the same change agent.

In this study, these discriminations became crucial to whatever degree of success is reflected in this work. It was in this stage of the change process that inter-relationships, both human and systemic, required the greatest amount of involvement for both the consortium change agent and the target system.

Future users of the change scheme, applied in this study, might well note that this stage of the model makes the entire change process come to life. It is here that the preparation for this stage will stand up as valid or not, and it is here that adoption or rejection will permit the process to continue to the ultimate goal of institutionalization.

The Installation Stage has as its stated objective to attempt to fit the characteristics of the invention to the characteristics of the adopting institution. As noted earlier in Chapter I, this would imply a possible redesigning of both the invention and the restructuring of the target system. Certainly the approach used in this study provided for both possibilities. In fact, the color delivery system was altered and improved as a result of new requirements developed in one of the projects undertaken by College B and noted in Chapter III.

It was in this stage that the writer was able to assess the extent to which the invention accomplished what it was designed to do. Details of this assessment were furnished earlier in this chapter. It performed within the design parameters established for its development.
However, the process of adoption which is another facet of the study indicated that other forces influenced its use and the institutionalization within the target system. Barriers to its use did not compromise the capacity of the color delivery system to perform. Completed visual materials were of high quality, inexpensive, and were produced by unskilled operators for a wide variety of projection methods. The invention did perform the task for which it was designed. The amount of use and the rate of adoption seems to have had little effect on its function as a vehicle for change. Thus, following the criteria of effectiveness and efficiency set forth in the model as a means of evaluating the Installation Stage, it must be considered a successful invention. So far as its relation to change is concerned, it was operationalized for use by specific institutions and made operational within the context of the local environment.

The writer did observe, however, that just as the involvement of the change agent increased from the Research Phase through the Trial Stage of the process, it diminished in this—the Installation Stage. It was here that the role of the facilitator from an outside source was replaced by the second-level change agent from within the target system. The outside change agent could still persuade, advise, and consult, but the restructuring, if it was to be natural, had to be generated from within. It is true that an outside change agent could exercise pressure to become involved in the internal working affairs of the institution without invitation, but this is not in keeping with the operational mode of a consortium.
Beginning with the installation process the outside change agent must be ready to relinquish certain personal control of the change process to the target system. The transfer may be awkward, and as will be noted later, provides for the disintegration of the structured change process. After all, the changed target system is the basic objective of the change process and change agents, both inside and outside of the target system, must not lose sight of this fact.

The installation of an invention into the context of an institutional environment is the culmination of this entire process and suggests that the sincerity of the initial commitment can begin to be evaluated here. One can begin to determine whether the invention is merely a novelty to be discarded once the pilot programs are completed; or whether it provides enough merit to be made a permanent part of the campus setting.

If, as the model suggests, the invention can be operationalized to fit the needs of a specific institution, the next logical stage of the process would be to institutionalize the invention as an integral and accepted component of the system's operation. The criteria set forth in the model calls for evaluating this stage in terms of continuity, valuation, and support.

Here again, the writer as an outside change agent, had to relinquish more personal involvement so that the target system could grow toward internal growth by developing a change mechanism of its own. If the invention was truly valid as a problem-solving device, the results of the target system involvement would motivate them to provide a mechanism that could regenerate change on an on-going basis, once the change agent had
withdrawn from the scene. Continued support of the invention would therefore transfer it to a non-invention, because it would then solve a class of problems which was not a new solution. Readers might take note of the fact that the change process can become bogged down at any stage of the scheme. It is more likely to remain static once the change agent diminishes his involvement in order to permit the target system to assume the role of leadership. If the stagnation is a result of the inability of the target system to know "how to do" rather than "what to do," the change agent can justly provide the consultative service that he had provided earlier. This can be done without compromising his role as an outside resource and will permit the target system to develop the new change mechanism in the best interest of the adopting institution.

One might summarize the Adoption Phase of the model as the most demanding so far as change agent involvement is concerned and the most sophisticated level to which the target system can aspire. The quality of the relationships, both with the change agent and within the target system, play an important role in whether the invention is accepted or rejected and whether or not it becomes a non-invention through the institutionalization process.

An Analysis of the Campus Pilot Projects

Certainly readers will have noted by now that this work has not devoted great effort to describing the invention, as might have been done in a typical media study. Equally absent has been great detail concerning the campus projects developed to use the invention as a problem-solving device. In Chapter III, the programs were reported as they oc-
curred and with minimal reference as to the results in terms of the change process. It is logical, however, to address ourselves to a brief analysis of the findings resulting from these efforts at this stage of the study.

There are several general statements that can be made as to the results before each campus effort is analyzed. First, one must recognize that these programs were studied over a one-year period of the time. This may have been a weakness in the study, but the writer decided that since the model did not indicate a specified time for the relationship between the change agent and the target system to continue, he should establish the time line for the study. The entire effort extended over a period from January, 1968, through September, 1969. The campus programs began in August, 1968, just before the beginning of the 1968-69 academic year. This is not to say that continued effort for an additional year or two would not have brought about more concrete results, but it does reflect the need to fix a specified period of time to initiate a change once the invention has been developed.

Secondly, one must recognize and understand the role of the writer as a change agent operating from outside the target system and through an agency specifically established to bring about change within a consortium of developing institutions. The results are, therefore, reported as they happened in a natural context and without alterations to the on-going operational structure established between member institutions.

Another influencing factor to remember is that the planned role designated for the second-level change agent permitted him to become an influential change agent in residence. One will note that each was treated separately by the outside change agent and was accepted or rejected as
a catalyst for change, depending upon how the target system perceived his or her role within the campus hierarchy.

Lastly, it must be understood that the target system, including the second-level change agents, were not made a part of the model application. The writer believes that inclusion of these agents would compromise the observation and could produce halo or Hawthorne effects and would not let the change process unfold in a natural way. With these facts restated as cues to the reader, let us examine the project findings in terms of the actual field experiences.

The campus projects, as individual efforts to produce high quality visual materials that were inexpensive and could be produced by unskilled personnel, were successful on each participating campus. That is, access to the invention, the color delivery system, provided the means by which the visuals could be produced. The invention as designed did perform, and the solution to a set of valid problems, noted in Chapter I, could be solved. The participants did have access to the invention; they were taught to use it; and they did produce customized software for classroom use.

For all intents and purposes the program could be considered a success. However, as we have seen, the existence of the invention did not ensure its use. Something else had to happen to initiate a change process among the participants. The writer used a consortium as a mechanism for change and he served as the change agent. In order to structure the change process, an accepted model was chosen and applied to the movement of the invention so that its progress could be isolated and followed.
With these components in proper perspective, each campus program was tailored to the particular contextual environment.

Each participating campus experienced only partial success in establishing the invention as an integral part of its new behavioral pattern. As noted earlier, the invention itself was a success; however, only two institutions approached a recognition of the need to institutionalize the invention and to create a local change mechanism to ensure continuation of the results of the pilot efforts. On one campus, the intended audience failed to become involved but an unintended audience made the program a success. Finally, one campus failed to use the invention at all, yet they were the first to voice endorsement and requested immediate involvement.

With this evidence in hand, it was apparent that something or someone did not perform as expected. The multi-variable situation, it was certain, allowed for only partial success. Some of the influences that became barriers to the total adoption process seemed to be:

1. The bias of the writer as an outside observer may have warped the interpretation of the results.
2. The consortium as a change mechanism may not be a valid catalyst for change.
3. The defined problems to be solved and noted in Chapter I might not be appropriate as valid reasons for the effort.
4. The model might not be a valid scheme for application to a consortium effort.
5. The contextual setting itself might prove to be an insurmountable barrier to change.

6. The campus hierarchy might not see the change as desirable, or advantageous.

It would appear that combinations of all of these items afforded an opportunity for the varying degrees of success noted here. It would be presumptuous to expect this study to stand as total evidence of the success or failure of the design strategy used in this work. Instead, this analysis would indicate that replication of the effort with other consortia efforts might add credibility to these findings. The writer believes, however, that future studies of this nature can find possible clues to initiating a planned change through examination of these statements.

An Analysis of the Consortium as an Agent for Change

One of the primary objectives of this study was to determine what kinds of structured activities are required to bring about the adoption of an invention in higher education, using an accepted model for change to help accomplish the task. The established change mechanism, the consortium in which the writer works, functions as a catalyst among developing member institutions within the region. It was hoped that by applying the referenced model to a planned process for change, the writer could develop operational guidelines in an effort so new that it lacks well defined and accepted guidelines for conducting business.

The model, a sequenced continuum, provided a guide for the writer that helped eliminate much of the intuitiveness associated with previous
planned change efforts. It afforded an opportunity to make certain generalizations about the effectiveness of a consortium to bring about change and also provided a field test experience for the model that probably had not been done before.

The model helped confirm the fact that most consortia enter into and possibly function best, at the Diffusion Phase of the planned change process. This is not to say that they should enter here nor does it indicate that the preceding phases of Research and Development are ignored, but rather that they are more intuitive in nature.

Another generalization that seems to have emerged from this study has been the notion that once the consortium enters the change process at the Diffusion Phase, it can move to the Trial Stage of the Adoption Phase in a normal fashion and with relative ease. Experience gained in this study supports the idea that consortium effectiveness begins to diminish considerably in the Installation Stage and in the Institutionalization Stage, simply because the target system must assume more of the responsibility for carrying the process upward through the internal structure of the institution. This seems to be an obvious weakness, but one must recognize that consortia operate by invitation and that membership, as well as participation, is voluntary.

It would seem that this observation should be an important operational hazard to consider for any group attempting to develop a new consortium. This appears to be especially important when one recognizes that most cooperative arrangements are established as a convenience or survival tactic by institutions that are weak financially, inadequately
staffed, or lack physical facilities to individually provide benefits derived from consortium participation.

The advantage of attempting to initiate the adoption of the invention from a neutral position, outside each individual target system, provided the greatest opportunity to structure the movement of the invention. This seemed to be the most unique feature of using a consortium to bring about change. Through the method of participation by invitation, the consortium representative could perform as a consultant in an objective manner. There did not seem to be a resistance to using the invention nor did suspicion of the writer, operating as a change agent, become evident.

In attempting to develop a "box score" that would reflect the positive and the negative aspects of using a consortium as a mechanism to bring about change, the writer would offer the following statements:

1. Positive Advantages
   a. Consortia arrangements are generally accepted as an organized and endorsed vehicle established to benefit member institutions. Changes in each institution are stated as one of the major thrust efforts entrusted to the consortium staff.
   b. Acceptance of ideas for possible change are more readily endorsed because the consortium is usually looked on as an extension of the local campus environment.
   c. Consortia staff members have access to all levels
of the total academic community, i.e., faculty, students, and administrators.

d. Consortia staff members usually possess specialized expertise that is not available on member campuses. They are, therefore, accepted as experts and credible sources of information.

e. By virtue of membership fee contributions, there is a tendency to look upon this involvement as purchased services and a reward for becoming a consortium member.

f. Since consortia staff personnel usually work by invitation, there does not seem to be a fear of subtle pressures to innovate, since the pressures are requested and are in an area represented by a particular staff specialist.

g. Consortia staff personnel have more time to do specialized organizational and program planning that would disrupt the normal campus structure and routine. It is, therefore, expected that each staff member will provide completed "staff" work that is not permissible on the local campus.

These are major advantages and are only few in number, but they seem to be the most salient advantages to using a consortium as a recognized change mechanism. Disadvantages isolated through this study seem to be:
2. Negative Aspects

a. By virtue of the fact that program participation is voluntary in nature, the consortium cannot force or even determine the amount of change nor the adoption of change on individual member campuses.

b. Consortia do not have a way to enforce endorsed commitment into program involvement.

c. Consortia efforts can rarely move an innovation to an institutionalized state without violating the staff role normally assigned to it.

d. Consortia staff personnel cannot replace the need for internal leadership and commitment to adoption.

e. Consortia personnel cannot ensure permanency or continuation of an institutionalized invention, as this must be controlled within the changed target system.

These then, become some of the positive factors along with the negative ones, that the writer would offer as reasons that could influence the effectiveness of a consortium effort. Needless to say, he subscribes to the notion that collective action is a means to bring about change, but much more time will be required to evaluate the long range possibilities afforded by such activities.
CHAPTER V

SUMMARY

Introduction

This study has aimed (1) to develop an invention that could possibly solve valid and identifiable problems that exist in an on-going educational setting, (2) to introduce the invention into a selected target system for possible adoption, and (3) to apply an accepted structured scheme to bring about a desired change within the context of the target system environment. The preceding chapters have been devoted to a qualitative description and analysis of the project.

One might interpret this work as an adult attempt to answer the plea noted on a placard, carried by a youthful student activist during a recent student protest march. His simple request of the academic community was to "make it relevant and tell it like it is." This study has tried to do just that.

The need for the study grew from an actual on-going contextual situation in which the writer performs daily. The problems defined in Chapter I were real, valid, and relevant to the setting. The invented solution applied to the target system was specially designed for and made available to the writer for this effort. Procedures designed for application in this work were appropriate for the role in which the writer functioned with the target system. Finally, the programs developed within the target system were initiated, using an accepted model designed to
follow the process of change in higher education.

If we could accept these statements of fact at face value and if the logical sequence of events happened as described, the project could be accepted as being successful and no further development of this chapter would be required. There were, however, only partial successes reflected here; complex interrelationships had to be developed and strengths and weaknesses brought into focus before final judgments can be made.

Perhaps the most sweeping generalization to be made at this point is that institutionalizing new technology within any target system probably involves more factors in that system than are reflected in present change theories, models, or in common sense. Seemingly neutral and beneficial methods of procedures in industry, agricultural communities, and in the field of public health, upon closer examination have proven to be much more complex. Some of these efforts have been accepted or rejected for what seem to the writer, to be illogical and irrational reasons. The study of these programs would indicate that we are rediscovering the principle, that a change in simple technology or a new method or procedure may become completely interrelated with a wider range of influencing factors within the target system.

This realization would indicate that there ought to be newly developed roles for fostering and initiating change. It became evident early in this study that the adoption of a newly-created invention is a process of many phases. There is need for an acceptable model to bring about change that can be made manageable within the context of any given target system. Such a scheme will help eliminate intuitiveness and would
furnish a change agent with a means of evaluation when he arrives at adoption. The ability to structure a planned change will provide credibility to the decision-making process, faced by each agent for change.

In developing the new roles noted above, it seems that we must recognize that they might become superior to, and in some cases exterior to the target systems being encouraged to change. In having such an arrangement, initiators of change must address themselves to problems of the type and quality that establishes the relationship between themselves, as sources of change and the target systems they are attempting to change.

These paragraphs are inserted here to establish the fact that what we are talking about is a complex arrangement of people, places, and things that must perform in a desired fashion, within the context of their environment and that the process of change is really the alteration of social behavior patterns. With this premise understood and accepted, let us summarize this study in terms of the stated objectives noted earlier, but always keeping in mind that the process of change is the primary objective and the adoption of an invention is the desired change.

The Engineered Solution to a Class of Problems

In earlier chapters, readers were made privy to the rationale for, the development of, and the implementation of an invention, the color delivery system, into a target system made up of developing institutions. It is believed that these descriptions are accurate and adequate to provide justification for its use and additional descriptive material would be of little value. Instead, let us examine the placement of such a device in the change process scheme. In this way, certain generalizations
can be developed in summarizing the involvement of the change agent in its development and application.

The traditional instructional situation of today is a system that has been developed independently of machines or devices. It seems to be one in which all machines or devices could be removed from the classroom without altering the level of the operation of the instructor. Educators appear to have used machines to assist them to achieve results that were planned without them. Furthermore, most audio-visual equipment is brought into the instructional process at the classroom level to operate in these "machine independent" situations.

If this is true, it could be similarly concluded that the present so-called media specialist makes little contribution to the desired learning objectives. Such a statement is harsh, but if often more true than not. Media specialists probably do not possess any less worthy professional intentions or desires, but administrative concerns for employing them, in an instructional situation, usually emerge after plans for the desired learning outcomes have been completed.

The writer, therefore, would contend that the role of the media specialist must change from that of a maintainer or distributor of audio-visual equipment to that of a systems designer, one who is significantly involved in the development of instructional systems. These concerns are offered as an evaluation that is applicable to the target systems involved with this study.

Problems noted in Chapter I are not unique and certainly developing institutions have no monopoly on them. Each audio-visual representative, administrator, or faculty member could have found a solution to in-
dividual institutions, had they been motivated to do so. In most instances, the "after the fact" involvement, noted earlier, compounded the campus problem.

It is for these reasons that the writer subscribes to the early involvement of the change agent with the invention. This need became evident in this study, especially when the model for change came into play. One can note that the invention becomes only one component in the designing activity of the engineered solution. This same involvement was also expected of the writer, as a professional staff member of the consortium.

The invention used in this study could have just as easily been a learning resources center, a library, a video tape device, or a movie projector. The same philosophy is still applicable, only the degree of developmental involvement is varied.

This idea becomes more evident as any change agent struggles with the many new inventions that are reflected in the deluge of hardware and software catalogues, brochures, and exhibited devices with which he comes in contact. One of the positive spin-off activities associated with this study was the conviction that was built in the invented system, by the writer, during the development of the invention and prior to exposure of the device into the educational environment.

This is not to say that each new device can or must include change agent involvement at the developmental stage, but it does point up the need for an investigation on his part to determine the appropriateness of the invention for the problem to be solved.
Certainly one must assume that the degree of credibility placed on the invention by the change agent will allow for a more thorough application of the invention into his designed solution to an operating problem within the target system.

Throughout this study, readers were able to take note of the lack of attention given to the internal workings of the invention and the process by which the visual materials were produced. The research, done by the writer in developing or packaging the invention for his audience, eliminated the need to field test and experiment with an unknown device. Past related experience with some institutional media specialists has indicated that they have sometimes compromised the adoption of inventions by ignoring this idea and have reinforced resistance factors as a result of system failures.

Once these factors have been placed in proper perspective, the change agent must place the device into the true meaning of an engineered solution for a set of known problems. This can justify the need for taking the systems approach to packaging the invention for usage within the target system.

Broadly speaking, the systems approach might be regarded as an empirically derived framework, that can serve as a guide for systematically proceeding toward the solution of the defined problems within the target system.

This study has allowed the writer to conclude that five main points about the above statement should be amplified and clarified.

1. It seems that the definite article the in the
statement calling for "the systems approach" implies a fixed set of operations which contains specific content. This effort supported the notion that this is not true. The activities employed by the writer, using the systems approach to solve a defined target system problem, followed a general strategy that was not fixed. Instead, planned change activities must be altered according to the nature of the problem and the contextual setting in which they occur.

2. The approach had been empirically derived. It was not a rigid mathematically derived model which might have resulted from a laboratory controlled experiment, but evolved according to the problem and its context within the target system. This study would indicate that it continues to change from real life experience.

3. The approach used here only served as an engineered guide to solve problems. The approach must provide a systematic order so that points for decision, critical to solving a given problem, can be faced systematically and necessary actions taken.

4. The approach used must provide for the systematic attack on the defined problem. The problem and all its elements must be thoroughly considered in terms
of available means and the progress toward solution must be regulated.

5. Once the problem has been defined, it seems that before efforts for solution are initiated, the problem must be clearly distinguished. Problems noted in this study were intuitively felt by the writer before they were actually outlined as noted in Chapter I. The systems approach can be generalized so the attack on the problem is addressed to the felt need. In this way, the change agent can determine its real nature.

In conclusion, the engineered solution becomes a systematic solving of a problem that is analytical and calls for planning and control methods for designing and developing the various parts and the interrelationships needed to accomplish the specified behavioral outcomes.

The Introduction of the Invention into the Target System

Probably the unique aspect of this program has been the attempt to establish a rationale for the existence of a consortium as a viable change mechanism. All proposals from consortia efforts have claimed this role as a part of the justification for their existence. None, however, have furnished a statement regarding the methods advocated for implementation of intended programs. This project had as one of the stated goals, the qualitative evaluation of a consortium as a possible initiator for change.

The writer, as a professional staff member of an on-going con-
sortium effort, had hoped to establish the fact that as a designed vehicle for change, we need to study not only the sociological and anthropological factors which facilitate change, but also the channels of information which are looked upon as credible sources for change by the member institutions. To the degree of success reflected in this work, the writer would offer the following concluding remarks.

The development of consortia as a means to collectively strengthen member institutions is a recognized national trend. There are more than 1,800 cooperative arrangements that have been identified by the United States Office of Education. As of this writing, there are fifty-one that are similar to the one in which the writer functions. The one noted here is the oldest and largest of its kind in the nation. It seems reasonable then, that an evaluation of its potential role as a change mechanism and the development of acceptable guidelines to implement change would contribute valuable information to others, who face the same problems of operating without it.

The writer developed this project on the premise that if a consortium is a viable mechanism for change, it ought to be concerned with the implementation of changes that are beneficial and desirable and that if found effective they should be institutionalized as a part of the structure of the target system.

It was also assumed that the stated objective of a consortium which professes to be a vehicle to diffuse information should recognize that the information seems to radiate from change agents, who may be somewhat more cosmopolitan and aggressive, compared to the more traditional and conservative members of the group. Furthermore, there seems to be
consensus that adopters of change accept influential sources for change from outside their local environments. It was with these thoughts in mind that the projects reflected in these pages began.

The various analytical descriptions applied to normal consortium activities in Chapters I, III and IV described the history, philosophy, and program involvement between the central staff and member institutions.

Throughout the study the writer has tried to establish the interrelationship between the invention and the change mechanism so that one may recognize the interdependence of one on the other. This becomes very important since we can all recognize that learning, by whatever strategy, is an individual matter. It is an accepted premise that groups, as such, of whatever size or however dealt with, do not learn. The individuals that comprise the group do learn—some in spite of, and others because of, the methods applied.

The consortium approach as related to this belief is evident throughout the study and sometimes clouds the definition of the target system. One might interpret the colleges as the target system, others the audio-visual representative; still others would single out individual faculty members as the primary targets for change. Whatever the interpretation, in consortium work all layers and levels of the academic community became part of the contextual setting and none are ignored. They all make up the complex framework that was a part of this study. Each campus presented a separate structure made up of the same audiences, but the effort was directed toward a customized program for each participant.

This flexible operational mode provides the basis for using a
consortium as a catalyst to bring about change and supports the stated goal for this consortium as well as the other fifty similarly organized consortia efforts referred to earlier.

Studies of the kinds of educational change which take place and the forces which produce change, make it clear that institutions in transition or development are extremely complex and difficult to understand. This study reinforces this thought and points up again the need for the flexibility afforded by a consortium, as a change mechanism to introduce an invention for possible adoption.

The ability of a consortium to act in behalf of all member institutions provided the opportunity to produce a planned change from outside the local campus hierarchy. The writer contends that this permitted an objectivity that could not have taken place as readily had the change agent been a member of the local staff. The fact that source credibility is an added advantage to any consortium staff member, makes his movement from campus to campus a much easier task and gives access to all levels of the academic setting. It might be well to note that as an outside resource for change, the staff member, acting as a change agent, can constructively criticize an operation and offer possible solutions to problems.

The Structured Change Process--An Application

The frustration of embarking on a trip without a map or attempting to build a house without a set of blueprints parallels the problem of attempting to change the behavior of a target system without a plan or model. Inventions, as such, await the educational community in never ending quan-
tities, shapes, and kinds. Industrial suppliers have marketed engineered hardware and software that can be adapted to almost any instructional objective. Why is it then, that the adoption rate has been so slow? Why is it that educators keep trying to solve the same problems rather than seeking alternatives that would create perhaps a new set of problems, but which offer feasible solutions?

Media journals and technical publications point with pride to isolated exemplary programs that, if transportable, might solve similar problems elsewhere. The writer does not believe that any educator would not enjoy learning about creative and innovative efforts no matter where they occur. Why then, are these innovations isolated and why have they not been adopted elsewhere?

These are some of the questions asked by the writer prior to this study. He was employed to function in an established organization developed to bring about change. He was charged with the responsibility of disseminating information about new instructional media technology throughout a consortium of colleges and universities supposedly ready to accept feasible solutions to their problems.

The obvious became apparent early in the research conducted and associated with this effort. Diffusion alone would not bring about adoption. The existence of inventions on campuses would not bring about adoption. The existence of established departments and staff personnel specifically set aside to help solve instructional problems would not ensure adoption. What then, could a change agent do to alter this situation and how would he know when he got there? How effective can a change agent become when he is not even a staff member of the local target system? The
availability for an acceptable structured model to bring about change would help. The need for a systematic approach to the problem was necessary.

The model chosen for this study and the rationale for the selection was made earlier in Chapter I, but it might be well to draw certain conclusions about its application in this effort.

The target system is made up of an environment that includes people, places, and things who are given certain inputs and stimuli to carry out a prescribed set of operations. It was, therefore, important to follow a system or scheme for change that takes all of these elements into consideration. It was intended that the writer could alter these operations and order them according to available research evidence and expert opinion, to maximize the probability of achieving specified behavioral changes toward adoption of an invention.

The model used was designed by credible sources, endorsed by the United States Office of Education and provided for institutionalization of the invention into the target system. It was based on the premise that education is a social activity and that the change process should synthesize the reordering of elements in the target system in new ways to provide a basis for alternative feasible decisions.

Thus, the writer had an acceptable model available, emphasizing that when attempting to employ a systems approach to the change process, whether at the lesson level, the course level, or the institutional level, one of the vital steps to be undertaken is to determine all the parts of the target system environment. Next, a determination must be made as to
the relationships between each part to the other and to the whole contextual setting. It seemed logical that the identification of these parts and their interrelationships is the heart of the systems approach.

During this effort, the writer felt a kind of security and strength of conviction in knowing that the initiation of the invention was being accomplished as a planned attempt to bring about a desired change. Certainly one could challenge his expertise in applying the model to the target system, but the fact remains that the effort was no longer intuitive and was not without a planned structure.

Difficulties encountered in the application of the scheme to a contextual field experience resulted from not being able to control the multi-variable influences. The participants could not be grouped alike nor could the application of each phase of the model be identical. The entry point of each participant on the model continuum had to be altered in accordance with the dimensions of each audience or target system.

The problems noted above were just as applicable to the change agent since a clear distinction could not be made at each stage of the scheme in a contextual situation. One must be constantly aware of the fact that a single formula for success that is transportable from one contextual situation to another is almost an impossibility. In other words, it is not the adopter which is the entity in the system, but the characteristic and the condition of the adopter that is the important ingredient to consider.

The application of this model pointed up that it was not the conditions of learning that were important, but the quality of the state of
those conditions within the environmental context. This distinction be-
tween entities and properties of entities seems to be a difficult one to
maintain, but appeared to be a very important one to remember.

The change scheme used provided the guide for planning and devel-
oping the planned change strategy to achieve the desired behavioral change
within each target system. On examination, one can recognize that it fur-
nished the change agent the opportunity to determine where human factors
could be enhanced and where automated, mechanical, or other procedures
could better accommodate the change process. It also allowed the oppor-
tunity to build on past related experience that indicated what will work
best and provided a means to eliminate those parts that contributed least
or negatively to the desired change.

So far as the particular model used is concerned, the writer has
discovered no evidence to indicate that any contextual field studies have
been made using this scheme to implement change. Certainly there is no
evidence to support the notion that any of the identifiable consortia have
attempted to structure a planned change effort such as noted in this study.

If this is true, the writer would hope that the descriptions con-
tained in these pages would be looked upon with favor, but always realizing
that this attempt implies that others should conduct similar studies to
verify, reject, or improve these findings.

**Program Strengths and Weaknesses**

It appears that the strength of this project can be found in the
unique role of the change agent and the flexibility of operation afforded
him by the consortium setting. Access to decision-making personnel, at
all levels of the target system hierarchy, provided the means to introduce the invention with relative ease. His vantage point outside the target system allowed the design strategy to be developed with objectivity and in the best interests of the local target system.

The writer, acting as the change agent, was able to better control observer bias. So much of the media research conducted in the traditional experimental mode has posed a question as to whether or not the expectations of the experimenter or the observer might distort his observation of target system behavior. This suggests that experimental bias may consciously or unconsciously operate, so that the very act of observation changes the phenomenon being observed and distorts the observation. In this project there was but one observer who was cognizant of the structured application of the model for change. The second-level agents were concerned only with the invention and its adoption on their local campus. The writer had access to their observations, opinions, and performance in a way that permitted these observations to become natural relationships and preserved the idea of reporting the project as a natural change process.

The added advantage of early association with the development of the invention, the color delivery system, afforded the change agent an opportunity not only to aid in the packaging of the invention, but also to set certain design parameters for its manufacture. The availability of the invention, as a component in the Design Stage of the planned change allowed it to be engineered into the packaged solution developed as a problem-solving device with greater credibility and confidence.
The major weakness that the writer felt throughout the project was the reliance on his own interpretations and observations of the total change process as it unfolded on each campus. The question as to whether the use of forms to gather hard data, would compromise the natural setting was a constant one. True, the standardized reporting forms would offer evidence to the reader and charts and graphs could be produced, but they would also manipulate the target system. It seems to be a valid thought to expect instructors and administrators who volunteer to participate in experiments to do this because they are personally committed to a particular outcome. On the other hand, had the change agent solicited involvement, it could be expected that those who participated would be more interested and motivated, but less concerned about exposure and scrutiny. It was also believed that the presence of forms would build a resistance factor that would impede invention usage. The absence of hard data is a result of the decision not to use them because of the reasons stated above.

The study is a qualitative analysis of events that happened just as they have been reported. The writer believes that the lack of quantitative data did not weaken the observation, but instead strengthens the premise that the project did not report events that were developed in an unreal contextual setting.

Implications for the Future

There is no question that consortia efforts will continue to grow in this country. Whether this will result from the need to survive, strengthen the quality of education, or for mere convenience will yet have to be determined. One thing is certain, they do exist today and they
do not have an accepted operating procedure to bring about planned changes among their member institutions.

Equally true is the fact that our technological growth will continue to outstrip our ability to absorb and adopt new inventions. Therefore, it seems reasonable that some kind of method must be developed to initiate planned changes within groups of people who are faced with solving particular classes of operating problems within the context of their environment.

It would be impossible to estimate the number of innovations in teaching methods which have blossomed briefly and then disappeared as the enthusiasm of the innovator faded or as new staff members replaced the original innovators. It is for this reason that the writer studied a change process that would have as its ultimate goal, the institutionalization of an invention into the on-going routine of the target system. In this way, it was hoped to eliminate the idea of the short-term usage of innovations noted earlier. It was believed that a change mechanism established to regenerate change on a continuing basis within local target system environments would help accomplish this task.

The results of this study can furnish positive implications for future development in that a consortium is, by design, a change mechanism established to launch new change mechanisms within a local target system. Furthermore, it appears that a large amount of new media research activity is provincial in character, beginning and ending within the institution that gave it its home. As a result, its scope, significance, and possible effect are limited to the one institution and the intimate circle of the
professional association, where it is reported to other members of the inner circle similarly engaged in projects of equally-limited scope and effectiveness. Designing experimentation at the outset, in cooperation with other institutions, may effectively set the stage for necessary replications, wider applications, and more variegated scope and design.

Conclusions

The purpose of this work was to determine whether or not a color delivery system designed to allow instructors to produce inexpensive color visuals, in optimal quantities, would increase their use in developing institutions. In addition, the writer studied barriers to optimal use through observations made of on-going contextual situations.

Preceding chapters have made repeated references to the fact that the color delivery system, specially designed for this project, did perform with merit when it was utilized. It must be concluded that the invention could provide the capability to produce the desired customized software and could, therefore, solve a set of operating problems, if the target system was motivated to become involved with its use. The barriers to its use, as noted earlier, were the lack of individual expertise on the campuses of the participating institutions and the lack of change mechanisms to institutionalize the invention as a component of the target system environment.

A number of specific conclusions and recommendations pertaining to the differences between the adoption of an invention, simply because it is available and the complex process of attempting to bring about planned change, have already been presented in the analyses and reports
of the activities on the four participating institutions. Accordingly, the writer will restrict his comments to conclusions related to the stated objectives set forth as the basis for this work. In the order that they appear in Chapter I, they are:

1. To isolate specific sources of faculty resistance in using audio-visual materials and the reasons for this resistance.

Where the invention was used, there is little question that the measure of success was due to motivation of the instructor, his access to the problem-solving device, his involvement with the production process, and his ability to produce the kind of visual materials he wanted. In this way, the study proved that the three deterrents to change noted in Chapter I were solvable by using the invention.

2. To determine how much the use of these materials might be increased as a result of participation of selected faculty members in evaluating and preparing college level audio-visual materials for pilot programs.

Programs developed on each campus did stimulate greater usage of visual materials on all participating campuses, except one. The selection of faculty members was not made by the change agent, but they emerged voluntarily and in a natural way just as might be expected in any educational environment. Their evaluation of the invention indicated that the device was appropriate to meet their needs and manageable within the local target system. The pilot programs developed, using the visual materials at
the classroom level, were effective according to the feedback furnished to the change agent.

3. To determine whether these pilot courses prepared under workshop conditions would help remove barriers to greater use of audio-visual materials by peer groups.

Evidence submitted earlier in Chapters III and IV indicated that on three of the four campuses, late adopters became users of the invention. It is not known whether or not this was due to the invention or the fact that late adopters traditionally endorse a successful effort. This usage may have been a result of the role played by the early adopter in the target system. That is, the late adopters might have perceived the early adopters as innovators within the faculty and they, rather than the invention, became the catalyst. Regardless of the reason, persons outside the early adopter group became endorsers and users of the system.

4. To determine the degree of frequency in using the system, as influenced by such factors that influence usage such as teacher time, budget allotment, compatibility to subject matter, and compatibility with existing distribution methods.

Usage was spasmodic as would be expected. Those who needed the invention used it and at the time they desired. This, of course, supported the premise that an instructor will be more comfortable with media technology that he controls. Some programs noted in Chapters III and IV required more use than others. In one instance, a participating campus per
mitted the invention to remain dormant for an entire academic year. Their rationale for this inactivity was furnished earlier.

Cost factors did not enter into the analysis at all, since the invention was furnished on a cost-free basis except for raw materials. Users were given access to a resource that was free to use and required only their creative involvement to produce the desired visual materials.

The fact that the visuals were used for slides, transparencies, film cells, etc., proved that the invention could produce visuals that were compatible with existing projection equipment.

The variety of participants and the disciplines represented by the projects produced and described in Chapter III would indicate that the color delivery system could produce materials applicable to a variety of subject area interests.

5. To determine what kinds of change mechanisms must be institutionalized to provide for continuing change.

The application of a structured scheme to bring about a desired behavioral change among developing institutions proved to be, by far, the most difficult task, the most complex procedure, yet the most interesting and rewarding part of this entire effort. The earlier concluding remarks should not be surprising. The writer believed that the color delivery system would perform as it did. The only unique feature was that it permitted local production of customized visuals that were inexpensive and could be adaptable to a host of end-item uses. It would, therefore, solve the operating problems that posed a barrier to using visual materials in the classrooms within the region.
The challenge of this effort was to justify and quality a consortium, as an agent or mechanism to bring about change. To do this, the writer structured a planned behavioral change using the model to initiate the change process and to fit the invention in a proper perspective in that process.

Results of this effort, though only partially successful, confirmed that the adoption of inventions is a result of a social process and do not necessarily result from the availability of the invention or device. They further offered several advantages to using a consortium as a mechanism to bring about change. Strengths and weaknesses offered earlier in this work, established both the viability of the consortium as a change mechanism and established the change model as an acceptable guide to initiate the change process.

The prototype programs developed under this project can provide the basis for replication by others motivated to improve the design strategy used here.

Final Statements

The cultural leg between research and application in education is commonly deplored. This study attempted to bring the research behind an invention and a scheme to initiate change in higher education into an actual contextual field experience. The implementation of both elements in to the environment was accomplished using an on-going change mechanism designed to initiate change in higher education. The entire program extend over a nineteen-month period, and although this portion of the effort end recently, the color delivery systems are still being used and the impleme
tation process continues to be refined.

The problems encountered before this study still exist, but to a lesser degree because of this effort. The writer, operating as a change agent, has grown professionally and the consortium procedures appear to have been altered to what might become a better solution to the process of initiating planned changes on the campuses of the member institutions.
APPENDIX I

A PROPOSED STUDY TO EXPLORE AUDIO-VISUAL PROGRAM DIRECTION FOR 1968-69

Developing institutions seem to have some rather unique problems and in many cases small private Liberal Arts Colleges have been ignored by both federal and state legislative bodies. They themselves, do not seem to be able to define their role in the total scheme of Higher Education. They do, however, seem to be dedicated to the premise that individualized instruction and the total personal development of the student is of prime importance.

The developing institutions that make up our consortium are isolated, understaffed, and in most cases operating on a low fiscal base. They do, however, aspire to improve the quality of instruction on their campuses and for this reason, the writer believes that the proposed project can possibly bring about an improvement for the total membership of KCRCHE.

The project described here is a direct outgrowth of the Cooperative Audio-Visual Resources Program presently funded under Title III. Initial effort under the referenced program has indicated that instructors in developing institutions do not use existing audio-visual materials nor do they plan to take advantage of new media technology because:

1. They do not have access to the equipment.
2. They do not know how to use the equipment.
3. They do not have production capabilities by which up-graded or customized course content can be produced at a low cost and still be compatible with existing facilities.

The project that I would like to do would be to develop a delivery system that would provide rapidly produced, immediate visuals in full controllable color at a very low cost and one that requires minimal skill level on the part of the user. I believe a system that helps eliminate the problems noted above could motivate instructors to use visual materials much more readily than they presently do. Thus, by developing customized visual materials for a specific block of learning, appropriate change mechanisms can be built into the institutional system that can have an impact at the classroom level. The writer would envision the study to be structured as follows:
Title: Development of a Delivery System for Producing Low-Cost Customized Visual Materials and Studying Barriers to Optimal Use of the System in Developing Institutions

Purpose: The purpose of the study is to ascertain whether a delivery system that would enable an instructor to rapidly produce customized color visual materials in optimal quantities is beneficial in motivating greater use of new media on campuses of developing institutions.

Specific Goals: 1. To isolate specific sources of faculty resistance to using audio-visual material and the reasons for the resistance.

2. To attempt to determine how much the use of those materials might be increased as a result of participation of selected faculty members in evaluating and preparing college-level audio visual materials for pilot programs.

3. To determine whether these pilot courses prepared under workshop conditions would help remove barriers to greater use of A-V materials by their peer groups.

4. To determine the degree of frequency in using the system, i.e. the factors that influenced usage such as teacher time, budget allotment, compatibility to subject matter and compatibility with existing distribution materials.

5. To determine what kinds of change mechanisms must be institutionalized to provide for continuing change.

The Vehicle: The writer would propose to use four sets of prototype hardware under development by the Research and Development Division of a broadcasting company, located in Kansas City, Missouri. The equipment has not been marketed and has a patent pending. The hardware has been developed to fulfill the commercial needs of T.V. and it is the opinion of the writer that this system has application in Higher Education. The only cost to the cooperating institutions will be the basic complement of raw materials needed to support the project. The true benefit in utilizing this equipment will be the opportunity to field-test the system prior to its being added to the already overwhelming stock pile of hardware confronting a classroom instructor. Certainly, it would be unique to test the effectiveness of an audio-visual system under "before-the-fact" conditions.
May 30, 1968

TO: Members of The Heritage Committee

FROM: Gavin L. Doughty

SUBJECT: Working paper on coverage and objectives of the Heritage Program

Because the Humanities Division endeavors to develop in students sensitivity and concern for human values, interest in understanding spiritual, intellectual, and aesthetic ideals, and the active participation in creative pursuits, the Humanities Division, in cooperation with the Divisions of Social Sciences and Languages, have developed the Heritage Program.

The Heritage Program is an historically sequenced five course series covering the world's contributions in philosophy, art, music, drama, history, religion, literature, with special emphasis on achievements from the Mediterranean area, Europe and North America, India, China and Japan. Students are encouraged to relate all course material to the central problem of the interrelation of Man, God and Society to aid in understanding, appreciating, and evaluating their historical and cultural heritage.

The Foundation sequence of Heritage Courses are as follows:

2111 Heritage I

A study of the important and lasting achievements of man from ancient times to approximately A.D. 500, with particular emphasis given to Greek thought and the economic, social, and political development of the Mediterranean world. Winter Term.

2112 Heritage II

A study of the entire Bible, with special emphasis on the concepts of covenant and law, the life and teachings of Christ, and the rise of the Church. Fall Term.
2113 Heritage III

A continuation of Heritage I, covering the period 500 to 1660 and giving special emphasis to the creation of Medieval cultural unity, the rise of nation-states, the cultural achievements of the Renaissance, and the effects of the Reformation. Winter Term.

2114 Heritage IV

A continuation of Heritage III, covering the achievements of the period 1660 to 1870 and giving special attention to the English and French revolutions, the Napoleonic era, the American Civil War, German and Italian unification, and the thought of romanticism and rationalism. Fall Term.

2115 Heritage V

A continuation of Heritage IV, covering the period 1870 to the present and giving special emphasis to the communist revolutions, the impact of scientific thought, nationalism, socialism, the effects of the world wars and the search for world peace, the development of modern philosophy, and the present "cultural explosion" and literary experimentation. Winter Term.

Observations regarding the Heritage Program.

1. The Foundation sequence of Heritage I, II, III or IV, and V is a graduation requirement for all students in the college. Note that Heritage III and IV may be taken by all students, but some concentrations require all five Heritage Courses. These include History and Political Science, Literature and Drama, Foreign Language, and Philosophy and Religion.

2. Unless a student receives credit by examination in Rhetoric, it is a requirement for the Heritage Program.

3. Heritage I, III, IV, and V replaces the following courses in the 1967-68 Bulletin:

   Western Civilization 103 and 104
   Introduction to Philosophy 102
   Introduction to Art 110
   Introduction to Music 110
   Introduction to Drama 110
   World Literature 141 and 142
   Rhetoric 101
4. Heritage II replaces four hours of Bible, two of which was the course Life of Christ, and two elective.

5. The integration of the above courses into the Heritage sequence saves considerable time-consuming overlapping in the presentation of material, and at the same time will result in better relatedness in the student's learning, as the professors from the Divisions of Humanities, Social Sciences, and Languages will be working as a team to present the material which was formerly offered in separate courses.

6. Much better and more efficient use of audio-visual aids will make the integrated course more effective than the former system.

7. Lectures will be given by specialists in the various areas of the course, which should make for more depth and understanding by the student.

8. Course integration will allow for "cross referencing" among the disciplines as important topics, ideas, and personalities are discussed.

9. Heritage II will allow faculty members and students to study the Bible as a whole, giving the student a better perspective of the material.

10. The course is planned for two one-hour lectures alternating with two one-hour discussion periods each week.


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