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A PROPOSED PROGRAM FOR THE DEVELOPMENT AND USE OF INSTRUCTIONAL MEDIA IN INDUSTRIAL TEACHER EDUCATION AT TUSKEGEE INSTITUTE

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

William Vincent Payne, B.S., M.Ed.

* * * * *

The Ohio State University
1965

Approved by

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Adviser
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CHAPTER I

INTRODUCTION

There is a continuing urgency for adequately prepared teachers in all fields of study. Within recent years, colleges and universities have been criticized for their shortcomings in the area of teacher education. Definite steps have been taken to alleviate the situation through the use of innovations. Among the most widely used are audio-visual methods and materials of instruction.

As in other areas of study, there is a need to improve the preparation of industrial education teachers. In view of the complexity of modern technology, and its tendency toward constant change in methods and materials of production, the problem of preparing industrial teachers is approaching the point of crisis. There must be an improvement in the methods and techniques of developing teachers whose concerns are centered largely around technical skills, industrial processes, and products of industry.

The use of audio-visual materials in higher education was given impetus as a result of their development for, and application to, wartime military training. When they were
first introduced in colleges and universities, they met some resistance because of the deviation from traditional methods of teaching and learning. They have now gained general acceptance.

The newer media of instruction are used in teacher education, and other programs of instruction at the college level, in secondary and elementary schools, by industrial firms, and at military installations. The latter continue to be foremost in the use and development of instructional materials. Many of the "breakthroughs" in the field of programmed instruction have come in the military training programs.

An example is the development of a variable-sequence self-instructional device in a former Air Force Laboratory at Lowry Air Force Base. It was developed originally on an experimental basis for teaching electronic trouble-shooting to Air Force technicians. The device has a high degree of flexibility and can present a wide range of problem materials, including silent motion picture sequences as well as microfilm frames. It can select any sequence of questions, problems, or other material from several hundred items stored on microfilm. A similar device is now commercially available.¹

Another "non-educational" institution that has contributed to the development of instructional media is industry. Manufacturing firms have incorporated these new methods and devices into their instructional programs. Being aware of the fact that industry thrives on efficiency, it may be to the advantage of higher education to consider for educational purposes some of the efficient practices utilized by industry in training its personnel.

It seems particularly appropriate for industrial teacher education to take cues from industry in developing and using instructional materials. This does not preclude experimentation and research in this area of study because instructional practices that will yield maximum benefits, in terms of skills, knowledge, and attitudes on the part of the learner are sorely needed. It does mean, however, that industrial teacher education can gain much by critically examining and evaluating what industry is using in its programs and then adapting that which is of particular use to the areas concerned. Concerted efforts in this direction would go far to develop the technical competence of those students preparing to earn a livelihood in a complex industrial society.

The federal government is vitally concerned about the development of instructional materials for use in vocational and technical programs. This point is brought out by Strong,
who indicates that the Smith-Hughes Act of 1917, the first federal legislation for Vocational Education through which trade and industrial education is aided, made special provisions for the preparation of teachers. The development of instructional materials for teachers was considered to be a part of a complete program of teacher education.  

This interest of the government in instructional materials is evident in the many books and pamphlets distributed by the United States Department of Health, Education, and Welfare, the United States Department of Labor, and special committees appointed by the President. The report of the Panel of Consultants on Vocational Education contains a listing of instructional materials needed in various areas:

1. The development of programed learning materials, and materials for other new media such as closed-circuit television.

2. Instructional materials for use with the overhead projector.

3. The design and development of pilot models of three dimensional teaching aids, with plans and instructions for local production.

4. Materials designed to acquaint counselors with emerging occupational training programs.\(^3\)

The fields in which these materials would be used are:

1. Programs under the Area Redevelopment Act, the Manpower Development and Training Act, and the expanding programs under title VIII of the National Defense Education Act.

2. New programs in agricultural, homemaking and distributive education.

3. Basic vocational training for clusters of occupations at the high school level.

4. Emerging vocational and technical programs beyond the high school.

5. Updating and upgrading programs in evening and part-time schools.\(^4\)

Another federal document, Vocational Education in the Next Decade: Proposals for Discussion, states:

Teacher trainers have rendered outstanding service in the preparation of teaching aids. Vocational teachers are in need of additional


\(^4\)Ibid.
teaching materials because the subject matter in vocational courses is constantly changing. Teacher trainers have helped to develop such materials. Some staffs are employed to prepare subject matter materials such as models, exhibits, color slides, film strips, motion pictures, electric boards, teaching outlines, instructional manuals, and other helpful teaching materials.

There is urgent need for expansion of this type of service including an interchange of teaching aids developed by the several States. Regional and national committees have been organized to coordinate the preparation of teaching aids. These committees review the new teaching aids that have been developed and encourage their use throughout the Nation.5

In March, 1964, the government published a progress report, entitled Innovation and Experiment in Education, by the Panel on Educational Research and Development. This publication includes a description of how a team of outstanding scholars and teachers designed a modern physics course, and used new instructional materials in its presentation. The "package" of materials included a textbook, film, laboratory guides, laboratory apparatus, programs for training teachers in the use of these materials, and a series of paperback books on scientific topics and scientists.6

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It is noted that in the present efforts to develop teaching materials, special emphasis is placed on the technology of education—motion pictures, television, tapes, and most recently programmed instruction. The development and use of these materials is increasingly under the direction of scholars and teachers. Until recently their use had been for the most part under the direction of technicians.7

The panel recognized that a large part of teacher education is preparation in teaching methods. Two major problems confront educators in this area: (1) To tie pedagogy to specific subjects, to specific levels of instruction, to real teachers, and to real children; (2) to find ways to reach rapidly and effectively large numbers of people in pre-service programs and in new programs of in-service education. For help in solving these two problems, the Panel turned to the film, which can show real situations, and provide real data for instruction in pedagogy.8

In a physics course, for instance, laboratory experiments enable students to see for themselves why Isaac Newton believed what he did. Films can simulate a laboratory by presenting, for the prospective teacher's analysis, teachers

7Ibid.
8Ibid., p. 24.
in classrooms, dealing with authentic teaching situations—including failures as well as successes.  

Although educational films have been used for many years, the majority of them lack the quality that is needed to make learning really effective. There must be greater emphasis on the relationship between learning principles and the content of films.

Educational television has proved to be an effective means of supplementing, and in some cases, supplanting, regular classroom instruction. Barach reports that it is used at all school levels, up to the graduate schools in universities. In 1961-62, there were 6,000 students registered in educational television courses given by colleges and universities for credit toward degrees.10

One of the new media of instruction that is at present getting considerable attention, is programmed instruction. Successful experiments with it in such subjects as the languages and sciences point the way to lightening the burden of individual teachers.11

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9 Ibid., p. 25.
11 Ibid.
Rowlett reports that several doctoral studies on the use of programmed instruction in industrial education have been completed since 1961. He reviews those by Hofer, Householder, and Ruehl. The study by Hofer was concerned with a comparison between the "effectiveness of self-instructional materials consisting of photographs and printed instructions in booklet form and demonstrations in teaching industrial arts manipulative operations."

Householder's study was "an experimental investigation of the relative effectiveness of a standard textbook, a linear program, and a branching program for teaching a unit on screw thread terminology and thread standards. In addition, the study was designed to test for any effect of the experimental treatment upon subsequent learning of a second task, a unit on metal forming processes, presented by means of a textbook selection."

A study by Ruehl was concerned with the teaching of electricity through the use of a teaching machine (automatic comparator) designed by the researcher. The study was conducted with students who were enrolled in a nine-week required freshman electricity course. Approximately one-half of the course

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work in electricity was devoted to related technical knowledge. The other half of the time was spent in conducting experiments and learning the basic skills associated with electrical work.

Under the supervision of instructors, the students solved mathematical problems that required the application of the laws of direct and alternating current. Each student in the experimental group had an "automatic comparator" with which to check his answers. This self-teaching device provided reinforcement through knowledge of results. Students in the control group were informed about their answers at the beginning of the class on the following day. A comprehensive objective test involving the application of the principles and laws of electrical phenomena, was administered at the close of the nine weeks, and again eight weeks later. The following are included in the conclusions Ruehl reached on the basis of his findings: (1) the automatic comparator apparently was an effective aid in teaching the application of electrical principles; (2) the automatic comparator apparently was an aid to students of all mathematical abilities; (3) while students using the automatic comparator achieved significantly better in the final test, these differences disappeared when a retention test was given eight weeks later;
(4) the use of an auto-instructional device can readily point out the weaknesses that a student may have in relation to the subject matter under study; and (5) the use of an auto-instructional device indicates to the teacher those phases of instruction which are confusing to the student.

While the new media of instruction are important to the field of industrial teaching, they do not obviate the use of traditional methods and materials. The Panel of Consultants on Vocational Education states: "Instructional materials in vocational and technical education include printed textbooks, workbooks, laboratory manuals, audiovisual aids, and three-dimensional demonstration apparatus." ¹³

Industrial arts, which is not subsidized by the federal government, does receive support from public agencies, such as state departments of education. These agencies are concerned about the use of instructional media in industrial arts education.

The Pennsylvania Department of Public Instruction considers the instruction sheet as one of the most extensively used, and one of the most valuable instructional materials

in industrial arts today. It can be used to the greatest advantage in the general shop because of the variety of activities carried on there.\textsuperscript{14}

The Ohio Industrial Arts Association, and the Ohio State Department of Education recognize that "in addition to adequate tools, machines, materials, and supplies, the successful industrial arts program depends upon textbooks, a rather complete library of supplementary books, and adequate audio-visual materials and equipment."\textsuperscript{15}

There seems to be a sharp awareness on the part of educators, scholars, and government officials of the important role that instructional materials can play in educational development. It is not claimed that the new media of instruction can solve all of the problems with which modern education is faced, but it appears likely that developmental programs based upon rigorous experimentation, can provide many of the answers that are being sought by those who are concerned about the education of present and future generations.

\textsuperscript{14} Commonwealth of Pennsylvania, Industrial Arts in Pennsylvania. Pennsylvania Department of Public Instruction Bulletin 331 (Harrisburg, Penn.: Pennsylvania Department of Public Instruction, 1951, p. 85.

\textsuperscript{15} The Ohio Industrial Arts Association and the State Department of Education, A Guide for Industrial Arts in Ohio Schools (Columbus, Ohio: Ohio State Department of Education, 1963), p. 32.
In his newly published book, *Shaping Educational Policy*, James B. Conant urges that an interstate commission be set up to plan a national educational policy. Among the critical problems that Conant suggests should be studied are: "Reform of instructional methods and materials, . . . and television and programmed instruction."\(^{16}\)

Conant's voice is one of many being raised in an effort to improve the conditions which tend to prevent maximum learning from taking place. Many of the problems have grown out of societal changes, among which must be included the spurt in the population growth, and advances in industrial technology. It seems that the challenge facing the schools is that of utilizing the technology to help solve some of the problems it has created.

**Definition of Terms**

The terms marked with an asterisk (*) are used as defined by Good\(^ {17}\) in *Dictionary of Education*.

*Audio-Visual Instruction:* An instructional technique employing materials and procedures not dependent solely upon the printed word (290).

\(^{16}\)Columbus Sunday Dispatch*, November 15, 1964, p. 9A.

Audio-Visual Materials: Sensory materials used in instruction. Included are motion picture films, filmstrips, transparencies, flat pictures, charts, graphs, disc recordings, audio tape recordings, video tape recordings, kinescopes, programmed instruction materials, models, mock-ups; displays, exhibits, and educational bulletin boards.

*Industrial Arts: An area of education dealing with socio-economic problems and occupational opportunities, involving experience with a wide range of materials, tools, processes, products, and occupations typical of an industrial society (41).

Industrial Education: This is used to embrace industrial arts education, and vocational trade and industrial education.

Instructional Media: All equipment, materials, and methods used in instruction, with the exception of printed textbooks, manuals, lesson plans, and instruction sheets. Included are audio-visual equipment and materials, demonstrations, and field trips.

*Student Teacher: A college student who is acquiring practical teaching experience and skill under the guidance of a supervising teacher or other qualified personnel (530).

*Student Teaching: Observation, participation, and actual teaching done by a student preparing for teaching
under the direction of a supervising teacher or general
supervisor; part of the pre-service program offered by a
teacher education institution (530).

*Teacher Education Institution:* Any educational in­
stitution concerned with the conduct of activities regarded
as significant in the professional education of teachers and
whose program is given appropriate recognition by state
agencies that certify teachers; institutions included are
teachers colleges, normal schools, and universities and col­
leges that have teacher education programs (289).

*Vocational Trade and Industrial Education:* The type
of education that prepares persons for employment in a trade
or industrial occupation or prepares employed persons in
trade and industrial occupations for advancement through
further training (603).

Statement of the Problem

The purposes of this study were to (1) determine the ex­
tent of usage of instructional media in industrial teacher ed­
ucation programs at selected colleges and universities through­
out the United States; and (2) develop a plan for an instruc­
tional media program in industrial teacher education at
Tuskegee Institute.
In other words, the purpose of this study was to answer the following questions:

1. How extensively are instructional media used in industrial teacher education programs at selected colleges and universities throughout the United States?

2. What are the criteria for the development of an instructional media program in industrial teacher education at Tuskegee Institute?

Scope and Limitations of the Study

This study was concerned with the use and development of instructional media in industrial arts and vocational trade and industrial education programs at selected colleges and universities throughout the United States. Instructional materials such as printed textbooks, manuals, lesson plans, and instruction sheets were not included in this study.

The panel of jurors from whom criterion scores were obtained for the validation of a questionnaire, was drawn from colleges and universities in midwestern, northeastern, and southern states. Southwestern and western states were excluded. The validity of the study is restricted in large measure to the personal subjectivity of the respondents to the instruments, and that of the writer.
Assumptions

The basic assumptions underlying this study are:

1. that selected industrial teacher educators are aware of the existence of the new media of instruction.
2. that there is a need for a change in the traditional methods of teaching employed in industrial teacher education.
3. that the use of instructional media enhances the teaching-learning process.
4. that the use of instructional media by instructors in teacher education institutions impresses upon the students the importance of such use in the teaching-learning process.

Methodology

Methods of obtaining data

Data for this study were obtained by reviewing the current literature on instructional media, through personal visits to selected colleges and universities for observations of facilities and interviews with selected teacher educators, and through the descriptive-survey technique. A questionnaire dealing with the use and development of the media in industrial education programs was sent to 150 teacher education institutions located throughout the United States. A
covering letter, and a stamped, self-addressed envelope accompanied the questionnaire. A follow-up was mailed, where necessary, three weeks after the original mailing.

Instrumentation

The two instruments used in this study were (1) an opinionnaire (Appendix B), and (2) a questionnaire (Appendix E). The opinionnaire was sent to twenty-five leaders in the field of industrial education to obtain scores for the validation of the questionnaire, which was distributed to 150 selected teacher education institutions. Fifty-two percent of the leaders are vocational trade and industrial teacher educators, and forty-eight percent are industrial arts teacher educators. The questionnaire mentioned above, was based primarily on the one developed and circulated by the Teacher Education and Media Project of the American Association of Colleges for Teacher Education, entitled "Questionnaire on New Instructional Media Utilization in the Pre-Service Professional Preparation of Teachers - May 1964." It also contained adaptations of the questionnaire used in the study by Swartout.19

Study Sample

A selected sample was taken from the following directories:


Treatment of data

The data from the opinionnaires were analyzed and interpreted; each item was assigned a code number, which was entered on a code sheet, and for the purpose of validation, the scores for each item were calculated. The raw data from the questionnaires were analyzed, interpreted, and tabulated.

**Significance of the Study**

This study is significant because considerable emphasis is now given to the use of instructional media in all areas
of education. It was assumed that the media were used in industrial teacher education programs, but the extent was not known. This study attempted to determine the status of utilization at selected colleges and universities.

The industrial education program at Tuskegee Institute is being reorganized. The technical program is being upgraded, and an industrial arts program has been established recently. Provisions are being made for the use of instructional media in the new programs. The writer believes that a far more effective job can be done in the preparation of industrial teachers through the use of such media. There is a special need at Tuskegee Institute because of the poor educational backgrounds of some of the students.

In cooperation with the federal government, Tuskegee Institute has just completed a pilot program in training and retraining unemployed, and underemployed persons of low socio-economic status in the South. The effectiveness of audiovisual methods has been demonstrated in the training of such persons in the armed forces. Although this study is focused on teacher education, there are implications for the use of instructional media in such programs that emphasize the development of skills.
Brief Summary of Findings

With regard to the use of instructional media in industrial teacher education at the institutions studied, it was found that 16 mm sound motion pictures are used more than any other media. Seventy-six percent of the 110 responding institutions indicated that this medium is used most frequently in their programs. Overhead transparencies ranked next to 16 mm motion pictures in frequency of usage. Fifty-nine percent of the respondents indicated this medium is used at their institutions.

As indicated by the responses, the medium with the least amount of usage is the video tape recording. Only 8 percent of the respondents indicated that this medium is used in their industrial teacher education programs. Of the newer media, such as single concept films, kinescopes, programmed instruction materials, and closed circuit television, programmed instruction materials were indicated to be used most. Thirty-one percent of the respondents reported that they use this medium in their programs.

Criteria were determined for an instructional media program at Tuskegee Institute, but a detailed program was not drawn up. A variety of factors would have to be taken into account before this could be accomplished.
Summary

This chapter has presented a theoretical introduction to the study, definitions of the terms used, the statement of the problem, the scope and limitations, the assumptions, the methodology used in the research, the significance of the study, and a brief summary of the findings. Chapter II will contain a review of the literature.
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CHAPTER II

REVIEW OF THE LITERATURE

It seems virtually impossible to make a comprehensive study of instructional media without reviewing the principles which undergird their development and use. That is, it is necessary to include a review of philosophical concepts, and theories of learning and teaching. The fact that the use and development of audio-visual materials involves far more than the mere use of "gadgets" has been recognized by educators and scholars for many years.

Communication and Learning-Teaching

The foundation upon which the learning-teaching process is based is that of effective communication. As Dale states it:

We can probe more deeply if we regard all teaching as a form of communication. Students of communication point to two essentials for effectiveness: the idea must be expressed clearly, and there must be a feeling tone of mutuality. Translated into the classroom, this means that there must be a sharing of experiences, that the teacher and his student must undertake to have experiences in common.1

With regard to the use of audio-visual materials in enhancing the learning process, he states further:

... there seems to be something intrinsic in sensory materials that promotes an atmosphere of mutuality. When we consider audio-visual materials as sources of sensory experience, we ... find abundant proof in the ways in which these materials contribute to the atmosphere of good feeling and mutual liking—of the sympathy that students look for in good teaching.\(^2\)

Schramm relates the origin of the word communication to its present-day meaning. It is derived from the Latin word communis, meaning common. When we communicate we try to establish a "commonness" with someone. That is, we try to share information, an idea, or an attitude. The essence of communication is getting the receiver and the sender "tuned" together for a particular message.\(^3\)

Dewey regards communication as a process of sharing experience until it becomes a common possession. It changes, to some degree, the personality of both participants in the process.\(^4\) It is pointed out that society is perpetuated

\(^2\)Ibid., p. 6.


through the means of communication of habits of doing, thinking, and feeling from one generation to another.⁵ The close relationship between communication and education may be noted when it is said that education, in its broadest sense, is the method by which life is continued through constant renewal of physical existence, beliefs, ideals, hopes, happiness, misery, and practices.⁶

A similar idea is expressed by the Educational Policies Commission when it refers to one form of communication:

Face-to-face spoken communication was not only the first kind of human communication to develop; it has remained, throughout history, the most commonly used. People speaking to people remains the fundamental mechanism of living together, whether in family groups or in entire cultures. It is still, generally speaking, a highly effective way of giving instruction or moving to action or producing change in attitudes.⁷

Those who bear the responsibility of guiding the education of others should be constantly aware of the fact that the communication process is a complex one. Each human being has different motivations, attitudes and needs; each has had many experiences which have been assimilated and ordered in

⁵ Ibid., p. 3.
⁶ Ibid., p. 6.
ways that are incessantly changing. Each attempt at communica-
tion, at understanding or being understood, is influenced by this prodigious personal context.  

The problem of communicating is to get two individuals to agree on the meaning of certain symbols. These may be words or gestures which are not likely to mean the same thing to any two individuals; however, the closer they can come to similar meanings, the more effective the communication will be.  

Brooker makes an interesting point when he says:  

We tend to think of communication as being a matter of words, and of words alone. This, in spite of the fact that every people has adages to the effect that "actions speak louder than words," that "seeing is believing."  

He views communication as  

... anything that conveys meaning, that carries a message from one person to another. The "message" exchanged may be an idea, a feeling, an attitude, a philosophy of life, a skill -- anything that one person believes is important to tell another.  

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8 Ibid., p. 48.
9 Ibid.
11 Ibid.
It is incumbent upon the teacher to arouse within his students an interest in learning, a desire to seek answers to questions, and to solve problems. There must be an atmosphere of sharing, of mutuality, of sympathetic explaining, of understanding. It seems that there are far too many situations in which the professor has no difficulty in teaching anything in his course, but his students have difficulty in learning it.\textsuperscript{12}

\textbf{Theories of Learning and Teaching}

The question is often asked: "Why use sensory materials?" It is a legitimate question, and the person who uses instructional materials in teaching should not be at a loss for an answer. Erickson points to this when he discusses the essentials for expert performance by the audio-visual director:

... A great deal is known today about teaching and learning, yet many educators remain confused. The director of audio-visual services must make a systematic effort to develop a set of working principles, a set of policies for action.\textsuperscript{13}


In 1937, Hoban and others emphasized the need of giving due consideration to learning theory in using instructional materials:

The values of visual instruction, the relative effectiveness of the various visual aids, and of the techniques of their classroom use have been too commonly discussed and investigated without regard for their relationships to other and more fundamental problems. They are discussed and studied, as it were, in abstraction. Such discussion of learning and such experimental evaluation of methods of instruction must necessarily be sterile and may become wholly misleading. The problems of visual instruction can be adequately appraised and validly investigated only when seen in proper perspective: both with respect to mental growth and learning on the one hand, and with respect to the objectives of education on the other.

For the correct orientation of visual education into the whole complex problem of learning it is necessary to examine the process of mental growth and to derive the psychological principles which apply to the values and use of visual aids.\(^4\)

The listing of knowledges and understandings by de Kieffer, with regard to teacher competencies in the use of audio-visual materials is begun with: "The teacher should understand the philosophy of education and psychology of

learning and their relationship to the use of audio-visual materials and equipment."  

Psychologists and learning theorists readily admit that the knowledge yet to be gained on how learning takes place is considerable. They will also point out that a void exists between what is known and what is applied in learning situations—namely, the classrooms.

Hilgard proposes that a taxonomy of learning, as it applies to the classroom, be set up. He points to the efforts made by Bloom in providing a taxonomy of educational objectives.

Several questions posed by Hilgard bring into sharp focus some of the problems with which educators have been and are faced:

What kinds of teaching can best be done by teaching machines? What is the most effective contribution of the classroom teacher? Of the specialist? What unique services have the library, the laboratory, the studio, the shop, the field trip? How do we teach curiosity, search initiative, inventiveness?

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17 Ibid.
Contrary to the views held by some theorists, Gage contends that the development of learning theories does not obviate the need for teaching theories. Analysis and specification are important in developing these theories. These analyses would include (1) types of teacher activity, (2) types of educational objectives, (3) components of the learning process, and (4) families of learning theory.  

This need for teaching theories is made clear when Gage says:

Explicit concern with the theory of teaching should benefit teacher education. In training teachers, we often seem to rely on mere inference from theory of learning to the practice of teaching. Yet, what we know about learning is inadequate to tell us what we should do about teaching. This inadequacy is clearly evident in our educational psychology courses and textbooks. The irrepressible question of students in educational psychology courses is, 'How should I teach?' While they may infer a partial answer from a consideration of how pupils learn, they cannot get all of it in this way. Much of what teachers must know about teaching does not directly follow from a knowledge of the learning process. Their knowledge must be acquired explicitly rather than by inference. Farmers need to know more than how plants grow. Mechanics need to know more than how a machine works. Physicians need to know more than how the body functions. Teachers need to know more than how a pupil learns.

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Teachers must know how to manipulate the independent variables, especially their own behaviors, that determine learning. Such knowledge cannot be derived automatically from knowledge about the learning process. To explain and control the teaching act requires a science and technology of teaching in its own right. The student of educational psychology who complains that he has learned much about learning and learners, but not about teaching, is asking for the fruits of scientific inquiry, including theories of teaching. 19

Cronbach gives the position taken by many psychologists when he says:

Educational psychology does not provide definite recipes for successful teaching. It suggests concepts to use in critically examining educational proposals. It presents evidence showing which procedures have been found undesirable. The teacher must continually use judgment and ingenuity in discovering the best methods for particular pupils. 20

Hilgard's views on the practical application of learning theory are these:

Theories serve more than one purpose: they attempt to organize existing knowledge, and they may furnish principles by which what is known can be used. This practical outcome is seldom central in the thinking of the constructor of theory, and it is not surprising, therefore, that the person seeking advice from the learning theorist often comes away disappointed. 21

19 Ibid., pp. 272-273.


Although there is considerable disagreement among learning theorists with regard to the interpretation of facts, Hilgard lists the following statements as those upon which he expects the majority would agree:

1. In deciding who should learn what, the capacities of the learner are very important. Brighter people can learn things less bright ones cannot learn; in general, older children can learn more readily than younger ones; the decline of ability with age, in the adult years, depends upon what it is that is being learned.

2. A motivated learner acquires what he learns more readily than one who is not motivated. The relevant motives include both general and specific ones, for example, desire to learn, need for achievement (general), desire for a certain reward or to avoid a threatened punishment (specific).

3. Motivation that is too intense (especially pain, fear, anxiety) may be accompanied by distracting emotional states, so that excessive motivation may be less effective than moderate motivation for learning some kinds of tasks, especially those involving difficult discriminations.

4. Learning under the control of reward is usually preferable to learning under the control of punishment. Correspondingly, learning motivated by success is preferable to learning motivated by failure. Even though the theoretical issue is still unresolved, the practical outcome must take into account the social by-products, which tend to be more favorable under reward than under punishment.

5. Learning under intrinsic motivation is preferable to learning under extrinsic motivation.

6. Tolerance for failure is best taught through a backlog of success that compensates for experienced failure.
7. Individuals need practice in setting realistic goals for themselves, goals neither so low as to elicit little effort nor so high as to foreordain to failure. Realistic goal-setting leads to more satisfactory improvement than unrealistic goal-setting.

8. The personal history of the individual, for example, his reaction to authority, may hamper or enhance his ability to learn from a given teacher.

9. Active participation by a learner is preferable to passive reception when learning, for example, from a lecture or a motion picture.

10. Meaningful materials and meaningful tasks are learned more readily than nonsense materials and more readily than tasks not understood by the learner.

11. There is no substitute for repetitive practice in the overlearning of skills (for instance, the performance of a concert pianist), or in the memorization of unrelated facts that have to be automatized.

12. Information about the nature of a good performance, knowledge of his own mistakes, and knowledge of successful results, aid learning.

13. Transfer to new tasks will be better if, in learning, the learner can discover relationships for himself, and if he has experience during learning of applying the principles within a variety of tasks.

14. Spaced or distributed recalls are advantageous in fixing material that is to be long retained. 22

Several of the above statements are particularly applicable to one of the newer media of instruction—programmed

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22 Ibid., pp. 486-487.
instruction. Included in the basic elements of this medium are active participation, reward, meaningful materials, repetition, and immediate knowledge of results.

Instructional Media in Higher Education

The Association for Higher Education and the Division of Audiovisual Instructional Service of the National Educational Association point to problems facing higher education in discussing the need for utilizing the media of instruction:

Recently, higher education has exhibited a trend toward a new support for instructional services and an extensive development of facilities to encourage the utilization of new media. This trend is founded on the changing roles of college teachers and influenced by increased enrollments, rising costs, and a growing understanding of the psychology of learning. The trend is encouraged by the increased availability of effective, appropriate, and convenient materials, devices, machines, and classroom facilities for improved teaching. 23

Impressive figures are given on projected enrollments in higher education for the next one and one-half decades:

The prospect is that the college-age population (18-21) will double between 1960 and 1980, to a total of over 17 million youth. If a constant proportion

of this number continues to enroll in higher education, enrollments also will double during that 20-year period. At present, there is every indication that higher proportions of young people will enter colleges, and persist longer, so that enrollments will double long before 1980. Total degree credit enrollments in 1955 were 2.6 million, or 31 percent of the 18-21 age group. A conservative estimate would indicate that the enrollment will reach 6 million before 1970 and at least 7 million by 1980. The 18-year-olds of 1980 were born in 1962, and growth of the magnitude indicated for college enrollments requires only a continuation of present trends.24

The increase in numbers is not the only factor that has to be considered with regard to students in higher education. There are more women enrolled; the proportion of graduate students and the average age of the undergraduate have increased. Students have greater ability as a result of improved education before college. Because of better preparation, more alertness, and increased readiness for college, the best students in the most selective private colleges begin on a higher level than their predecessors of a decade ago. As a result, major elements in the curriculum are offered in the freshman rather than in the sophomore year. On the other hand, many public colleges enroll able youth from homes in which education and intellectual activity have been negligible values. As a result, many of these

24 Ibid., p. 2.
students face learning difficulties that stem not so much from lack of intelligence as from deprivation and poor motivation. Their preparation for college entrance has been in school alone, and in no other aspect of their lives.\textsuperscript{25}

Another area of concern in higher education is that of re-education of persons whose occupations have been outmoded by new inventions or insights. Included in this category may be the doctor, the engineer, the teacher, and the businessman.

The implication for the new media of instruction is to make contributions to the process of education for those students who are not quite the most fit, or whose experience and backgrounds for higher education require special consideration. Other implications are to increase the realism and dramatic quality of instruction, and to heighten the involvement of students with their courses.\textsuperscript{26}

Besides changes in the character of student bodies, an equally important consideration is the problem of having enough professors for the increased number of students. On a national basis, about 40 percent of college professors now hold earned doctorates. It has been estimated that by 1975

\textsuperscript{25}Ibid.

\textsuperscript{26}Ibid., pp. 2-3.
this proportion will drop to 20 percent. It seems unlikely that incentives such as increased salaries and technical assistance will provide enough new recruits to college teaching to maintain present standards of class size and practices of student-professor interaction.27

In addition to a shortage of professors, there is evidence that many highly educated instructors lack the adequate skill for organizing and presenting knowledge, and lack facilities for working with students outside of the classroom. Too often they rely on the lecture as the sole method of instruction, and rarely seek other techniques that might lead more directly to their objectives.28

The implications for the media are (1) to contribute to improving large-group instruction without loss of quality, and perhaps with some betterment; (2) to contribute to effective self-instruction, and thus free the professor for more face-to-race contact with the students, and (3) to help the professor communicate more effectively what he knows, what he can do, and his attitude toward his discipline.29

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27 Ibid., p. 4.
28 Ibid.
29 Ibid.
Brown and Thornton point to some of the reasons why the instructional media are resisted by professors:

In higher education, as elsewhere, it frequently seems easier to continue doing things as they have always been done and to leave experimentation to others. It is understandable, of course, why there is sometimes a reluctance to try new ways of teaching in colleges and universities. The instructor does not wish to abandon practices which have proved useful and particularly not for alternative practices with which he is unskilled or which students themselves may dislike because of their unfamiliarity. Neither does the instructor look with favor upon surrendering some of his freedom of operation to other individuals or organizations on whom he must thenceforth depend. Some newer teaching media (as, for example, films and television) do require electronic equipment and, frequently, the services of another person, perhaps a projectionist, to use them. They also require dependence to some extent upon an organization to ensure that all scheduling details are properly managed and that the right materials appear in the right places under proper physical conditions—all according to some carefully pre-arranged schedule. Things can (and sometimes do) go wrong at these junctures. And when they do, instructors lose a certain amount of face (as well as confidence in the system) regardless of where faults lie.30

The fact remains that if college teaching is to be improved, it must be studied continuously, and creatively. Experimental approaches to teaching must be tried, evaluated, improved and tried again.31


31 Ibid., pp. 172-73.
A third important problem facing higher education is the curriculum. The amount of knowledge accumulated today makes it necessary to plan different educational programs for students of different talents. However, higher education has attempted to introduce significant common elements into the curriculum. The implication for the new media of instruction is to provide greater uniformity of contact with essential concepts of the culture.\textsuperscript{32}

Another aspect of the rapid growth of knowledge is the careful selection of elements to be included in the curriculum of higher education. Although the median time in school has increased considerably through the years, there is a limit to the number of years that can be devoted to full-time schooling. The implication for instructional media is to contribute importantly to speeding up the process of learning.\textsuperscript{33}

A third aspect of the growth of knowledge is the need to bring about a change in attitude toward curriculum revision. There must be a realistic evaluation of the present worth of each course—for the undergraduate as well as for the prospective professional. The implications for the media

\textsuperscript{32} New Media in Higher Education, p. 5.
\textsuperscript{33} Ibid., p. 6.
of instruction are to bring the materials of instruction into harmony with the requirements of our times, and to keep them continuously current.\textsuperscript{34}

In concluding discussion on the problems facing higher education, the Association for Higher Education and the Division of Audiovisual Instructional Service of the National Education Association turn to finances:

Cost factors of higher education are revealed in each of the preceding problems. The presence of large number of students, the need to recruit more professors, the necessity to introduce new curriculums and to expand or improve old ones, and the employment of newer technological devices and facilities to achieve greater instructional efficiency are all reflected in increasing expenditures for higher education. It has been suggested that increasing costs will be borne by increasing taxes, tuition rates, voluntary contributions, and economy of operation. Since the provision of higher education of high quality will continue to require tremendous additional expenditures over the remainder of the twentieth century, one question will surely be repeated--

\textit{Will new media of communication increase efficiency of instruction enough to offset the cost rise?}

Any procedure or medium that can provide more economical instruction without sacrificing excellence will gain some acceptance and use in the enterprise of higher education. But for various and complex reasons, it may realize only minimally its promise of fiscal economy. Difficult questions will be required in the cases of proposed uses that are

\textsuperscript{34} Ibid.
viewed favorably by trustees and administrators, but with suspicion by professors who fear their effects on job security, individual freedom, or rewards or conditions of work. The more logical question then becomes—

Can attention be concentrated on educational improvement that will result from the use of new media so that their use may be justified by a comparison of results rather than solely on the basis of dollar savings?35

The Fund for the Advancement of Education recognizes the failure of higher education to make full use of instructional media:

Laboratories are equipped to help the student expand his knowledge by experimentation. Pictures, records, musical instruments, audio-visual aids of various sorts have all been accepted by modern Mark Hopkins as desirable means of instruction. For the most part, however, education has not made full and efficient use of modern technology to improve instruction and extend the reach of the best teachers more widely. When manpower is abundant in any field, it is often used wastefully, and only the pressure of necessity prompts us to supplement and extend the reach of human endeavor by better capital equipment. Faced with the growing certainty of an acute shortage of capable teachers, some of the colleges interested in better utilization of their teaching resources have turned to the potential in modern technology.36

35Ibid., pp. 6-7.

Instructional Media and Teacher Education

When educational institutions engaged in the preparation of teachers begin to use instructional media in such preparation, the quality of instruction at all levels should rise appreciably. There are many situations in which the media are used extensively, but far too often they are neglected by teacher educators.

In discussing the value of the materials for the teacher, de Kieffer says:

It is widely recognized that audio-visual materials are not ends in themselves and that they alone cannot accomplish the task of education, but if they are wisely selected, properly evaluated, and effectively utilized, they can greatly facilitate learning. The teacher then is the key to effective learning. His skill and ability in utilizing these materials become all-important. His knowledge and understanding of the value and limitations of various media of communication will determine how he can best put his skills and abilities to the most practical use. 37

With regard to pre-service teacher education, de Kieffer states:

There are inconsistencies in the over-all program of audio-visual materials in our institutions for the education of teachers. We must consider what constitutes adequate preparation for pre-service teachers not only with reference to subject matter content, professional theory, and student teaching, but also in

37 de Kieffer, p. 23.
respect to the skills, knowledge, abilities, and understandings a student must possess to become a master teacher. Then we can unify our attack in developing a program which will insure that those teachers will be adequately prepared for their work in public schools.

We must keep in mind that our responsibility to prospective teachers does not cease when they graduate. The success or failure of beginning teachers is a direct reflection of their preparation. Material which is not covered in their undergraduate work becomes the subject for in-service study. Year after year local school systems and extension divisions of universities devote their time and energies in programs directed to educating teachers in the use of audio-visual materials. And each year many new teachers who lack the basic understanding of these materials as they apply to the teaching situation begin their work in the schools. The process of in-service education is again repeated.

Our future teachers must be better prepared at the pre-service level if they are to do an effective job of teaching. If this is done, in-service education programs can be directed towards areas and needs which are peculiar to local situations.38

The old axiom, "Teachers teach as they are taught and not as they are taught to teach," points up a major problem faced in pre-service teacher education. Are future teachers being provided with the knowledge, skills, and understanding necessary to teach, or are they receiving merely a background of information about teaching? Do pre-service teachers have enough opportunities for developing skills and abilities in

38 Ibid., p. 19.
utilizing audio-visual materials effectively as complementary aids to instruction, or are they being equipped with a background of subject matter only?\textsuperscript{39}

Teaching and learning are nothing more than the transmission or communication of ideas by the teacher and the understanding and assimilation of these ideas by the learner. If those ideas have been clearly understood, it may be assumed that the learner will translate them into desirable and accepted patterns of action. Thus we must utilize every process, device, and method by which we can be assured that our ideas have been communicated. A critical analysis of our own instructional methods and procedures will illuminate areas where learning has been nonexistent or ineffective. It is at these points that audio-visual materials can and will assist in the clarification of concepts and the improvement of instruction. Future teachers must be provided with the tools of teaching and the skills to utilize them effectively.\textsuperscript{40}

The application of instructional media must be considered in every phase of the future teacher's curriculum— in the lecture halls, in the methods classes, in special audio-visual

\textsuperscript{39} Ibid., p. 15.
\textsuperscript{40} Ibid., p. 16.
classes, and in professional laboratory experiences, especially in student teaching.  

The role of teacher education is that of molding and grooming future teachers who have the knowledge, skills, abilities, and techniques that are necessary to make learning vital, real, and understandable. These students must be familiar with audio and visual materials as they relate to the ideals of master teaching.

In 1961, Paul V. Robinson wrote:

To date the impact of technology has had little effect upon curriculum, classroom, or teachers. Misunderstanding and resistance are predictable when the new or unknown is introduced. ... Until it can be demonstrated to teachers and administrators how technology benefits the curriculum, the learner, and the teaching process, we will be forced to use the future tense in discussions regarding it.

The relationship between theory and practice is one of constant readjustment of means and ends, the adjustment resulting from experience with a problem. Before technology can be expected to exercise an impact upon educational practices, it must first create an effect upon those who are to participate in its day-to-day use. Experimentation must occur among student-teachers, teachers, technical engineers, and methods specialists concerned with new approaches to curriculum.

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41 Ibid., p. 17.

42 Ibid.

43 Paul V. Robinson, "Two Rooms with a View," Audiovisual Instruction, VI (February, 1961), p. 46.
A more optimistic report than the one immediately preceding is given by Klein:

The use of audio-visual aids is as old as education itself. Early primitive tribes used teaching aids to instruct the young in the vital ways of keeping alive and obtaining food. Unfortunately, once education was formalized the use of teaching aids declined and education became highly verbalized. Within the past decade the situation, however, has become quite promising. There are many people in education who have put the well-publicized theories of audio-visual education into practice.

There is a trend to have more equipment available for teachers. It is significant that the initial planning of new buildings and equipment now will frequently include audio-visual equipment which is permanently assigned to a department or classroom. There also is a definite trend to permit teachers to use equipment from the audio-visual center for the entire year, thus saving the frustration and time-consuming, red-tape actions of getting equipment and sending it back. Simple computation will show that a modern classroom can be supplied with the equipment listed below for about $2250.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Cost</th>
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<tr>
<td>Record player</td>
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<td>Overhead projector</td>
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<td>2x2 filmstrip projector</td>
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<td>Opaque projector</td>
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<td>Tape recorder</td>
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<td>16 mm sound projector</td>
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<td>TV monitor screen</td>
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</tbody>
</table>

Including the above equipment in all of the classrooms in a 35-classroom school with 84,746 square feet built at a construction cost of $13.04 per square foot, would add only about 90 cents to the square foot cost. With modern classrooms costing from $15,000 to $45,000 each and teachers being paid from $4,000 to $10,000 a year, it would seem penny-wise and pound-foolish to place a teacher in an expensive setting and not give him the equipment to do the job adequately.

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The number of school systems giving the classroom teacher the educational tools that are needed is increasing. As a result of this, the film libraries have been expanded and teaching material centers have been organized. Inexpensive plastic models are available that can replace real-life objects. New methods of instruction have been developed to make maximum use of the tape recorder in the classroom. The field of audio-visual education is changing so fast that materials, methods, and equipment of just five years ago may be drastically changed. The teacher's desk of the past was standard—now new schools have the overhead projector built into the desk so that it is flush with the desk top. The resistance barrier to audio-visual materials has truly been broken. 45

It would seem axiomatic that any person preparing to teach in the schools of this country should be skilled in the use of audio-visual materials. Regretfully there are many institutions that do not prepare their graduates for the modern classroom. As a reaction against professional education courses, the number of units for developing teaching skills has in some cases been reduced to a minimum. There

are two courses of action open to remedy the lack of audiovisual instruction—one is the insistence of NCATE that the teacher education curricula in accredited institutions provide for audio-visual instruction; the other is that the teaching certificate require proficiency in the use of instructional materials. 46

On the subjects of requirements for teacher certification and use of media in teacher education Miller says:

One can make sure that all teachers get some exposure to audio-visual methods by making it a requirement for teacher certification. This has been done in Pennsylvania and California. . . . The student teacher is more impressed by example than by precept. Teacher education institutions mold the habits of future teachers, but there probably is no teacher education institution that uses graphic techniques throughout so that the apprentice teacher learns to appreciate these methods through repeated experience with them. Therefore, one of the most important tasks is to try to bring about the widespread use of superior graphic techniques in all teacher education institutions. 47

In his report on the study of teacher education at selected institutions throughout the United States, Conant stated:

Four of the 6 California institutions [included in the study] required courses in audio-visual education. Three gave 2 semester hours of credit for the course; the other gave 1. It should be noted that California

46 Ibid., p. 120.
certification required a course in audio-visual edu-
cation. Two of the institutions considered here had a special arrangement whereby the State Department of Education accepted their regular methods courses as including an adequate amount of audio-visual edu-
cation.  

Since the publication of Conant's report, the Cali-
ifornia legislature has reduced the amount of time required in methods courses in teacher education instructions. As a result, the state board of education chose to eliminate the previous requirement of audio-visual methods from the state credentials for teaching.

It is interesting to note that while they observe the credentials law, all of the California teacher education in-
stitutions continue to offer audio-visual courses, and most of them have chosen to require audio-visual instruction in some form.

A recent survey was conducted with regards to audio-
visual offerings at California's teacher education institu-
tions. The results are presented in Table 1.

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50 Ibid.
TABLE 1
STATUS OF AUDIO-VISUAL INSTRUCTION IN CALIFORNIA TEACHER EDUCATION INSTITUTIONS

<table>
<thead>
<tr>
<th>Units of AV Instruction Required by Teacher Training Institutions</th>
<th>% of California's New Teachers Receiving AV Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>One or more sem. units of AV instr.</td>
<td>New Elem.</td>
</tr>
<tr>
<td>Some, but less than one sem. unit AV instr.</td>
<td>64%</td>
</tr>
<tr>
<td>Total percent receiving at least some required AV instr.</td>
<td>9%</td>
</tr>
<tr>
<td>Not requiring AV instr.</td>
<td>15%</td>
</tr>
<tr>
<td>No report</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>


Rather extensive documentation of the contribution of instructional materials to learning can be made. In spite of the abundant research showing that audio-visual materials are necessary for the greatest amount of learning, until the last decade only a few schools used them extensively. The use of instructional materials is important to education now, and will be in the future. Among the outstanding reasons are the need for larger classes, increased material to learn,
and highly complex ideas to teach. Research has shown that audio-visual materials can be used to teach understandings, skills and attitudes effectively.\textsuperscript{51}

What are the results of some of the research on the preparation of teachers with respect to the audio-visual area? Generally speaking, there is a positive correlation between the amount of instruction a teacher has had in audio-visual materials and the extent to which these materials are used in the teacher's class. One doctoral study explored not only the degree of use of instructional media, but also investigated the relation of the use of those media to teacher competency. It was found that there is a significant positive relationship between the administrators' ratings of teacher competency and the extent of use of instructional media. Some of the teachers in the study expressed the opinion that the degree to which their college professors used audio-visual materials was influential in determining the extent to which they used the materials in their classrooms. Perhaps institutions of higher learning should require in-service courses so that the college professors may become more proficient in this area.\textsuperscript{52}

\textsuperscript{51}Klein, The Outlook in Student Teaching, p. 119.
\textsuperscript{52}Ibid., p. 120.
It was also pointed out in the study that the majority of the teachers and administrators consulted believed that a course in audio-visual instruction is necessary. The school administrators stated that the course should be required of all students preparing to teach. It is rather generally agreed that this course should be a three-semester-hour course, meeting three or four times a week.\(^1\)

With respect to audio-visual education being offered as a part of the methods course, Klein says:

Such practice is unsatisfactory. It is the old story of covering a large amount of material in a short period of time. The desired attitudes and emphasis upon all aspects of audio-visual instruction,\(^2\)

The prospects of increased utilization of the instructional media in the preparation of teachers are brightening. In 1964, the American Association of Colleges for Teacher Education reported:

A recently completed pilot study of new media utilization in the pre-service preparatory sequence of teacher education revealed that while but fifteen percent of reporting teacher education institutions are currently operating well planned media utilization programs, sixty percent are presently involved in long-range planning emphasizing the use of instructional

\(^1\)Ibid.

\(^2\)Ibid., p. 121.
media in professional teacher preparation curriculum. The decision makers in teacher education are aware that the knowledge and population explosions are forcing a near miracle expansion of facilities in the coming decade. Of equal concern are the new instructional technologies currently reshaping the academic process and the need for the entire educational community to become adaptable to these changes. The "direction of the Sixties," therefore, forecasts a breakthrough in new media utilization among teacher education colleges and universities.⁵⁵

**Instructional Media and Industrial Education**

The purpose of using audio-visual methods in education is to improve teaching. When they are used intelligently, audio-visual materials can improve teaching at all levels, and in all areas of study. This does not mean that they are cure-alls for every teaching situation. Nor does it mean that teachers should discard conventional methods and materials. Audio-visual materials must be seen in their relationship to the teaching-learning process as a whole. When properly used, they greatly enhance the opportunities for learning.⁵⁶


The recent literature on the development and use of instructional media in industrial education is largely concerned with the newer media, such as overhead transparencies, 8 mm single-concept motion pictures, programmed instruction, educational television, tape recordings, filmstrips, and slides. Some of the above are used in combination, and some are used with other media. While such materials and methods as educational bulletin boards, exhibits, demonstrations, field trips, and opaque projection are used frequently in industrial education, they have not been treated extensively in the recent literature. Specific applications of some of the media to industrial education are reviewed on the pages that follow.

Mock-ups

The mock-up continues to be an important medium for teaching skills and information in industrial education. Considerable time is required for planning and constructing such devices, but their effectiveness in clarifying ideas and processes more than compensates for this investment.

Hammock and Makin describe a mock-up of a multipurpose-action internal combustion engine in the December, 1964 issue of *Industrial Arts and Vocational Education* magazine. This
device is a three-dimensional cross-section of an engine cylinder, which can be manipulated to demonstrate the principle and operation of a reciprocating engine. This mock-up, which is large enough to be seen from any position in a room, has an advantage over a small dismantled engine exposing the main parts of the motor. The latter is frequently too small to be used with a large group of students. The former may be used in an introductory course in a vocational automotive shop, in a general shop for teaching power mechanics, in an agriculture shop for teaching tractor operation and maintenance, and possibly in general science or physics courses for teaching engine operation and theory.\textsuperscript{57}

By changing a few parts as the need arises, the instructor can illustrate such concepts as (1) action of the basic Otto four-stroke cycle engine operation, (2) action of the two-stroke cycle engine operation, (3) action of the four-stroke cycle diesel operation, and (4) action of the two-stroke cycle diesel operation. The basic cylinder unit illustrates such parts as the cylinder wall, piston, rings,

spark plug, connecting rod, crankshaft, intake exhaust valve, spark plug, injector, carburetor, blower, and crankcase. \(^{58}\)

Tape Recorder

When used properly, the tape recorder can be a helpful teaching device in the industrial education program. It may be used for accompanying filmstrips, and for giving instructions. The recorder has proved to be of considerable value for the planning of projects, the making of projects, and for giving demonstrations. Project information to be included on the tape should begin with the idea and planning stages, continue to the bill of materials, the three-view drawing, and steps in making the project. Each of these sections should be described in detail, and show the relationship between future activities and past experiences. \(^{59}\)

Tape recordings made for the purpose of accompanying slides can greatly improve the learning situation. These recordings command student attention even better than "live"

\(^{58}\)Ibid., pp. 40-41.

narration by the instructor. Carefully prepared narrative scripts that fit the slides provide more precise and effective presentations. 60

Slides

The use of slide sequences as a medium in the shop can contribute much to the learning process. Properly prepared and presented slides have been proved to be able to communicate ideas and skills. Unlike motion pictures, the cost of slides is low enough to permit each teacher to have them readily available at all times. Another advantage of slides is the ease with which they may be updated. With little difficulty, new slides can be added to the sequence, and old ones eliminated. This cannot be done with filmstrips. Furthermore, 35 mm slides are easily produced by the instructor, and tailored to meet the needs of his lesson plans and shop facilities. 61

Slide sequences may be used effectively in promoting a high quality of workmanship, and in giving students ideas for


61 Ibid.
projects. These may be accomplished by taking color pictures of well-made projects of the advanced students, and showing them to the beginners.\textsuperscript{62}

This medium has the desirable feature of fitting the shop situation in which the slides are to be used. This is so because the shop equipment and facilities are used in the process of making the pictures. For example, in the step-by-step sequence on "timing an engine" in an automotive shop, the same engine as used in an actual teacher demonstration on timing is pictured. The student also uses the same engine when he does his first tryout on timing an engine. After viewing the slide sequence, the experience should be much more meaningful to the student.\textsuperscript{63}

It is not always necessary to have a sequence of slides to present certain information; sometimes one may be sufficient. A single slide is adequate, for example, to project a schematic diagram of an ignition system on the screen. If a shop cannot be darkened adequately for showing slides, an instructor should consider using a rear projection screen.

\textsuperscript{62}Ibid.
\textsuperscript{63}Ibid.
This type of screen, which has been developed recently, permits images to be seen clearly in a fully-lighted room. 64

Filmstrips

In the January, 1964 issue of Industrial Arts and Vocational Education, Cipolletti reports on the production of filmstrips by the industrial arts teacher. Too often a teacher shows a film and finds that the material presented covers only a part of what he really wants covered, and it deals with points that he would rather present at a later time. These problems are eliminated when the teacher makes his own films. Furthermore, the students are more interested in the material being taught through custom filmstrips because the tools, equipment, and setting are familiar. When local production is done, the material is tailored to the needs of the individual teacher, and presented to the students in his own individual manner. 65

Overhead projector

Of all the newer instructional media, the overhead projector has the most widespread use in industrial education.

64 Ibid., p. 27.

This is because it is particularly adaptable to the teaching of drafting. With regard to the use of the overhead projector in teaching drafting, Earle says:

The teaching of engineering graphics and general drafting has been hampered by the limitations imposed by the use of the blackboard. The advent of the overhead projector has provided the drafting teacher with a more effective and versatile means of presenting problems.66

Most drafting problems lend themselves to the overhead projector, but some specific problems that are more adaptable to this medium than to others are (1) problems with sequential steps, (2) problems requiring demonstrations, and (3) problems involving related or alternate points. Sequential problems may include primary and secondary auxiliary views, intersections, orthographic projection problems, and charts and graphs. Demonstration problems suitable for presentation by overhead projection are freehand sketching, geometric construction problems, lettering, sectioning, and pictorial problems. Instruction in alternate or related points may include dimensioning, sectioning, orthographic projection, and conventional practices.67

Lemley believes that two primary criteria often omitted during instructional planning for the drafting program are


67Ibid., pp. 37-38.
(1) properly structured learning experiences with emphasis on sequential progression, and (2) adequate visual materials to supplement the traditional program. Drafting technology and the formalizing of production drawings have undergone some revolutionary changes in recent years. These changes have brought about the necessity to teach more related information and a greater range of diversity in the application of drafting room practices. It is possible to accomplish the additional tasks by utilizing the overhead projector.  

The value of the overhead projector is realized through the preparation and use of transparent plates and overlays. These are prepared by rendering drawings and instruction sheets in ink on imperial tracing cloth. The sheets are then printed by dry process direct printing on viewfoil or reproduction transparencies, which are then used in a determined instructional sequence. Some of the advantages of using the overhead projectors are (1) the ability of the teacher to always be in a position facing the students while the material to be taught appears on the screen behind him,

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(2) the accelerated rate of learning and a higher degree of retention on the part of the students, (3) the permanency of the transparent plates and overlays for repetitive and future use, and (4) the leaving of an assignment on the screen for one group while the teacher avails himself for assistance to another. 69

Schwartz would use the overhead projector in drafting for some of the same purposes mentioned by Lemley, but in addition he would project drawings completed by students on the screen for critical analysis by other students. Furthermore, he points out that any transparent object, such as a plastic triangle, template, protractor, ruler, or T-square may be used to demonstrate actual drawing procedures. Such concepts as reading a scale or protractor may also be demonstrated by using transparent instruments. Opaque objects can be projected in the form of a silhouette—demonstrations on how to sharpen and point a pencil, or how to adjust and sharpen a compass lead may be shown on the screen. 70

69 Ibid.

Motion pictures

Some of the newer media may be used frequently for particular areas of study, but 16 mm motion pictures, which have been used in industrial education for many years, have almost universal application. The April, 1964 issue of School Shop lists some recently-made 16 mm films that are available for various areas:

Automotive—Tommy Looks at a Tire is a 20-minute, sound-color film giving information about research, development, and testing in the manufacture of tires.

Building Trades—Time for a Change is a sound-color film which traces the path of mineral gypsum from its source in the earth to its use as plaster in homes and buildings. Wonderful World of Quality Paint is a 15-minute, sound-color film that takes the viewer on a tour of a paint manufacturing plant and explains the chemistry involved in developing paints and varnishes.

Machine Shop and Metalworking—Precision Tool Making and Machining—Keystone of American Industry is a 24-minute, 16 mm sound-color film exploring the role of the tool and die precision machining industry in mass production. Also shows how apprentices are trained. The Pulley is a 12-minute sound film, in black and white—or color, that portrays the history and background of the pulley and shows how it is used in conventional and complex machines. Stainless Steel Fabrication is a series of seven films dealing with fabricating processes, finishing, care and maintenance, and uses of stainless steel.

Plastics—Plastics: Industrial Processes and Products is a sound-color film designed to provide viewers with an understanding of the basic manufacturing processes of the plastic industry and their applications to the production of consumer goods.
Woodworking—A Model for Every Shop—Power for Every Job is a sound film showing how the DeWalt radial-arm woodworking machines are used in various applications.71

The 8 mm film, which until recently was produced primarily for home use, is now being used for educational purposes. As Barnard points out, some of the advantages of this medium are (1) it weighs one-fifth as much as the same number of frames of 16 mm film, (2) it occupies only one-half as much space as the 16 mm film, (3) it costs about 30 percent less than 16 mm film (including sound striping), and (4) the projector for it is smaller, lighter, and less expensive.72

Accessibility is a key factor in using 8 mm film. It is possible to have it always available in the shop or classroom so that it may be utilized at the right time. The silent single-concept film, which runs from two to four minutes, and is permanently loaded in a plastic cartridge, may provide greatest accessibility.73

Instead of giving a demonstration to individual students, or to an entire class, an instructor may tell a student to check out a film on Soldering, for example, and insert it in


72 D. P. Barnard, "8 mm Film: Is it Practical?" Industrial Arts and Vocational Education, LIII (January, 1964), 42.

73 Ibid., p. 47.
the projector mounted above the soldering bench. After the student has observed the film several times, he should be ready to solder. If he has missed a point, he can view the short film again.\textsuperscript{74}

In some cases action in the 8 mm film could be in slow motion so that the student could perform the operation as he watches the picture. An aircraft manufacturer uses this technique for instructing workers. They assemble electronic devices while watching films or slides, and sometimes listening to accompanying recordings. The worker not only learns the job faster, he also makes fewer mistakes.\textsuperscript{75}

Another advantage of the 8 mm film is that it can be produced locally with little difficulty, and inexpensively. The use of this medium in conjunction with field trips is another practical purpose it can serve. Class visits to local industries or museums may be recorded by the instructor. Such films could be useful in helping students to recall and remember what they may have observed.\textsuperscript{76}

\begin{itemize}
\item \textsuperscript{74}Ibid.
\item \textsuperscript{75}Ibid.
\item \textsuperscript{76}Ibid., p. 50.
\end{itemize}
Educational television

Literature on the use of educational television in industrial education is meager. However, there have been experimental programs involving this medium at various levels. Two such programs are reviewed on the following pages. One is concerned with closed circuit television at the collegiate level, and the other with open circuit television at the elementary level.

Educational television was used experimentally in eleven teaching areas in industrial education at the University of Maryland. The areas were art, metal, drawing, electricity-electronics, audiovisual, general metals, shop maintenance, shop mathematics, welding, and woodworking. Closed circuit television was found to be applicable and appropriate for all of the eleven areas in which instruction was given. As a medium of instruction, it was found to be suitable in teaching situations where minute operations and processes, and inaccessible or unsafe observation conditions prevailed.\footnote{Paul J. Manchak, "Closed-Circuit TV and Industrial Education," School Shop, XXII (October, 1962), 22.}

During the first semester of the 1961-62 school year, a series of lessons on household mechanics was presented on
television for the 7B classes of the Detroit schools. A committee of teachers was formed to prepare the instructional material so that the major teaching could be presented one day a week. The supplementary teaching was done by the classroom teachers the remaining four days. The success of the educational television lessons depended upon the on-camera teacher. He was responsible for obtaining or producing most of the teaching aids and devices. He was given adequate time to prepare each lesson. As a result, he was able to study new industrial processes, and incorporate them into the lessons.

Problems are created when an industrial arts course is taught by means of television. Curry and Weeks list the following:

1. Several questions had to be answered, such as: What should be taught? What can be taught best on television? What can be taught best by the teacher in the shop?

2. Some principals had difficulty in scheduling classes so that a 7B class would be taking household mechanics during the telecast.

3. The television reception in some areas of the city was not good.

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4. Some principals and teachers had trouble scheduling television equipment so that the sets would be available during broadcasts.

5. Very few funds had been made available for the purchase of supplies and equipment used for producing television programs.

6. It is difficult to obtain certain materials which are not on the regular supply lists.

7. Commercial companies have been most generous in providing equipment and other visual aids. Finding the right items at the right time sometimes presents a problem.

8. All programs are originally presented live from the television studio. This presents the problem of transporting equipment to and from the studio. 79

The lessons presented on television in Detroit had not been evaluated statistically at the time the report was made, but the indications were that pupils do learn better when taught by this method. The interest of the viewing pupils was higher than the non-viewing, the quality of work was better, and more information was learned. 80

Programmed instruction

Programmed instruction, a self-teaching method, and one of the new media of instruction, is being used increasingly at all levels of education. The types of learning to which

79 Ibid., p. 30.
80 Ibid., p. 32.
it may be applied range from basic verbal skills to complex statistical procedures. Units of learning may be prepared by the teacher, or acquired from professional concerns specializing in programming. Drozdoff says this of programmed instruction:

The impact of programmed instruction on the American educational scene is great and will become greater. Some proponents of teaching machines have declared this device to be the panacea of our crowded instructional program. When teaching machines were first introduced some teachers were under the mistaken impression that they might eventually be replaced by a machine.

However, under close scrutiny these methods developed by S. L. Pressy [sic], B. F. Skinner, and N. Crowder offer an opportunity for teachers to utilize a teaching method that practically guarantees 90 percent teaching success with all pupils. The machines on the educational scene today vary from the very simple to the extremely sophisticated used in conjunction with computers. However, it is not necessary to utilize expensive hardware in order to use the instructional written program in the classroom.

Technical education instructors should become acquainted with this teaching technique for use in specific areas. Its adaptation offers unlimited possibilities in the industrial arts laboratory. Individual programmed units can be made by the teacher in the form of a little booklet to familiarize pupils with the mundane teaching chores such as nomenclature of tools and equipment, steps in finishing procedures and other applications. Many teachers have some topics to be taught that are difficult to "get across" to pupils. These areas of difficulty can be overcome by programming the information.
Teacher-prepared programed material can be one of the best teaching aids yet devised if properly utilized by each instructor. All teachers as professional people should make every effort to become thoroughly acquainted with this technique.\footnote{Gene Drozdoff, "Teacher-Prepared Programed Units for Industrial Subjects," Industrial Arts and Vocational Education, LIII (October, 1964), 25.}

John L. Feirer regards programmed learning as "one of the important new techniques of instructional technology that should find wide use in industrial education." It is an excellent technique for the teaching of related information, and is particularly useful under conditions in which students are working in many different areas of instruction at the same time. The major limitation to its use now is the extremely small number of commercially prepared programs available in the field.

Industry and the military services have developed some audio-visual programmed units to aid in the teaching of certain manipulative experiences, but in industrial education the dependence will largely be on the teacher demonstration and work done on the job. It would not be possible for a student in auto mechanics to disassemble and assemble an engine until he has had the real tools in his hands and has learned to use them properly.\footnote{John L. Feirer, "Programed Learning in Our Instructional Tool Kit," Industrial Arts and Vocational Education, LIII (October, 1964), 43.}
Since students in industrial education must learn both information and skills, it is necessary to use many different methods. Programmed learning should be available for use along with the demonstration, illustrated lecture, overhead projection, team teaching, TV instruction, textbooks and other media. In this way, a balanced program so necessary to good teaching and industrial education can be achieved.83

After extensive study and evaluation of the method, Sussex Vocational-Technical Center, Sussex County, Delaware, adopted programmed instruction for six courses. These are Basic Electronics; Career Arithmetic; Trigonometry and Algebra; Food Sanitation; Hospital Asepsis and Diabetes Control. The courses are taught through the use of teaching machines, which are used by high school students during the normal classroom day and by adults in evening classes.84

It was found at the Sussex Center that a large percentage of the students were improperly prepared in one or more basic skills, such as arithmetic. The machines have been

83 Ibid.

useful in teaching subjects they may have missed or failed to grasp in a normal classroom situation. Adults use the machines to review previously learned skills and to learn new ones.\(^8\)

Student reaction to the programmed courses has been favorable. The machines tend to keep their attention at its peak since they must pay strict attention to what is taught in order to proceed successfully through the units. Both fast and slow learners seem to increase their ability to learn technical subjects in shorter periods of time. This aspect of machine teaching is particularly important because of the type of curriculum offered at Sussex Center.\(^9\)

Programmed learning has proved to be an asset to the instructor at the center. They have been relieved of the need for close personal student supervision. They are now able to spend valuable class time with slower students, helping them through difficult phases of the course. From an administrative point of view, it is believed that the programmed learning has assisted materially in upgrading the curriculum and instructional level of the Center.\(^7\)

\(^8\)Ibid., p. 18.
\(^9\)Ibid.
\(^7\)Ibid.
It has been mentioned previously that industry and the military have often led the way in the development and use of instructional media. They have tried programmed instruction as a means of solving the training problem brought about by the rapidly expanding technology. Industry has accepted this medium as an effective method of teaching and is using it widely for all types of materials. It is provided in basic subjects such as psychology, management training and manipulative skills. International Business Machines obtained significantly better test scores in 40 percent less time after programming a lecture class on its 7070 data processing system. Eastman Kodak Company programmed psychology lectures for supervisors, and the result was that the trainees gained twice as much information. Dupont estimated a 25 percent increase in the amount of learning in 25 percent less time by the use of programmed materials.

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As for the teaching of manipulative operations, many industries have used a method of presentation involving slides and synchronized tape. In some cases this method has been used for the initial training period only. In other cases of long, complex, sequences, the learners follow the instructions presented by the machine throughout the process of learning a skill, or set of skills. It is contended by some authorities that this method is technically not programmed instruction. However, the learners gain more from this form of instruction than from supervisors. Most companies report savings of 25 to 50 percent in training time with this method of presentation. When used for instruction in the assembly of electronic units, the auto-slide instruction devices have contributed to substantial gains in both quality and quantity of production.

91 Philip W. Ruehl and Armand G. Hofer, p. 103.
It is pointed out that one of the side benefits of program-
ming manipulative instruction is careful planning of the
job. Bruner makes the same point when he says:

What one teaches and how one teaches it with the aid of such devices [teaching machines] depends upon
the skill and wisdom that goes into the construction of a program of problems. The art of programming a
machine is, of course, an extension of the art of teaching. To date, most of the programming has been
intuitive and has been entrusted to a teacher of known reputation. It has been remarked by teachers
who have written tapes for teaching machines that the exercise has the effect of making one highly con-
scious of the sequence in which one presents problems and of the aims of the sequence—whether, for example,
one is trying to get children to memorize materials or use materials cumulatively in doing progressively more
difficult problems.

Related Studies

Many studies have been made on the use of audio-visual materials at all levels of education. A few of those are
reviewed in this section.

Comparison of the use of audio-visual materials for mil-
itary purposes with their use for higher education under-
standably draws some criticism. However, there is much to


be gleaned from such a comparison when industrial teacher education is considered. With regard to military training during the war, Finn states:

The personnel of military establishments had to be trained for hundreds of new and specialized jobs. Furthermore . . . there was a constant retraining problem as well.

Tank drivers had to be converted to radio operators; quartermaster troops had to be trained for infantry duty; the manpower requirements could never be completely foreseen, and retraining and flexibility was the answer.

Retraining had two other aspects. One was that conditions and equipment changed so rapidly during the war that even the same units had, in many cases, to be retrained to meet demands.96

In this study, Finn points to the problems to be solved, and the steps taken to arrive at solutions through the use of audio-visual materials.

With regard to the need for learning new skills, and retraining for useful occupations, situations similar to those described by Finn exist in many sections of the United States today. Tuskegee Institute, the institution with which this writer is affiliated in the capacity of an instructor, has just completed a pilot program for the training

and retraining of low-income persons in the Deep South. It seems feasible that such programs could be accelerated, and the learning made more meaningful and permanent through the use of audio-visual materials of instruction. Therefore, the findings of Finn could have some bearing on the study being conducted.

Swartout's study is concerned with the administration of audio-visual programs in institutions of higher education. Particular emphasis is given to the organizational patterns in the various colleges and universities covered in the investigation. In some institutions, the audio-visual materials program is administered through a single unit—an audio-visual center. In others, there is some degree of de-centralization, in that several of the colleges or departments have separate facilities, or sub-audio-visual centers. In support of the latter arrangement Swartout states:

Usually the complete centralization of materials is less expensive, so if saving money is our object we centralize. But we are also interested in getting the most educational value per dollar of money expended. For example, School A might spend $50,000 on instructional materials which were completely centralized and improve learning 5 per cent. School B, which was equal to School A, might spend $75,000 on instructional materials which were controlled centrally
yet administered through sub-centers according to frequency of use, and find that learning was improved 10 per cent. It took more money in the second case because more prints, filmstrips, slides, charts, and projectors had to be purchased for those sub-centers, but educationally it produced more education per dollar. The suggestion is not made to eliminate the audio-visual center in favor of several audio-visual centers; rather it is suggested that both the audio-visual center and the sub-audio-visual center must be eventually formed. 97

Swartout investigated both existing and desired practices in the administration of audio-visual programs at ten selected colleges and universities. His stated hypothesis is: "There is a normative plan for administering audio-visual centers in higher education." He approached the problem by (1) studying the literature written about the audio-visual field; (2) giving a questionnaire to the audio-visual directors of the institutions being studied; and (3) visiting the audio-visual centers for interviews and observation.

The study by Swartout is pertinent to the problem under investigation in that the desired outcome is to set up a sub-audio-visual center at Tuskegee Institute, primarily in order to improve instruction and learning in the industrial teacher education program. At present, the use of audio-visual materials there is practically nil.

Gibbony made a study of instructional materials centers at selected teacher-education institutions to determine what they were doing in regard to providing experiences and assistance to their students, especially their student teachers.

A four-page questionnaire was mailed to 240 institutions, 182 of which responded. This represented a return of 75.8 percent. The instrument was designed to obtain information about (1) the nature of the instructional materials center of service at the respondent institution, including student experiences with instructional materials; (2) the nature of the student teaching program; (3) the instructional materials services available to student teachers; and (4) opinions regarding (a) the most valuable aspects of the instructional materials center or service, and (b) aspects which seemed to need improvement.98

Among her major findings Gibbony includes (1) student experiences with instructional materials were provided in the form of required audio-visual courses by less than one-fourth of the teacher education institutions studied; (2)

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the audio-visual equipment most frequently loaned to student
teachers are combination filmstrip and 2 x 2 slide projectors,
and tape recorders; and (3) between 10 and 15 percent of the
institutions indicated that all their student teachers used
the instructional materials center.

The study by Gibbony is relevant to the one conducted
by the writer in that the former was concerned with the use
and development of instructional materials at selected
teacher education institutions, with emphasis on the ser­
vices provided by the college or university instructional
materials center, while the latter was focused on an in­
structional media center for a specific department.

Hassouna's study dealt with a proposed in-service pro­
gram in audio-visual education for teachers in industrial
schools in Cairo, Egypt. He attempted to answer several
questions: (1) What are the desirable conditions to success­
fully accomplish such a program? (2) What courses of study
would be desirable? (3) What are the audio-visual materials
and equipment needed for such a program?

Hassouna used the questionnaire as the instrument for
the investigation after a review of related literature. He
constructed questionnaires for teachers alone, principals
alone, and one for teachers and principals.
Among his findings were that the 16 mm sound motion picture projector ranked as the most important piece of equipment needed for the promotion of instruction in industrial education, and that there was a similarity between the teachers' opinions and those opinions offered by the principals and supervisors in regard to the needs for audio-visual materials and equipment. The coefficient of correlation was found to be high and significant. 99

Summary

This chapter has been concerned with a review of the literature on communication theories, learning theories, use and development of instructional media in higher education in general, in teacher education, and in industrial education. The types of materials that may be used in industrial education were discussed briefly.

Of necessity the discussion has not been confined to the higher levels of education. Since students in teacher education are being prepared for service in elementary and

secondary schools, it is logical that the use of media at these levels should be considered.

Chapter III will develop the evaluative criteria, standards, for organizing an instructional media program in industrial teacher education.
CHAPTER III

EVALUATIVE CRITERIA

The purposes of this study were to (1) determine the extent of usage of instructional media in industrial teacher education at selected colleges and universities, and (2) to develop criteria for the establishment of a program for the use of the media in industrial teacher education at Tuskegee Institute. In order to accomplish these purposes it was necessary to submit a list of standards, criteria, to a jury of leaders in industrial teacher education for their approval or disapproval. These leaders were located at twenty-five selected colleges and universities in midwestern, northeastern, and southern states.

Eighteen, 72 percent of those to whom the opinionnaires were sent, responded. Two of the eighteen failed to respond in time for the data to be included in the study. The criteria that follow were determined after the instruments were returned and scored. On a four-point scale the range for each criterion was as follows: Strongly Agree - 4; Agree - 3;
Disagree - 2; Strongly Disagree - 1. The data are divided into seven categories headed (a) Background Information; (b) Administration of the Instructional Media Program; (c) Development, Acquisition, and Use of Instructional Equipment, Materials and Methods; (d) Instruction in Development and Use of Instructional Media; (e) Facilities for Instructional Media; (f) Budgetary Aspects of the Instructional Media Program; and (g) Evaluation of the Instructional Media Program.

**Background Information**

Criterion 1: Because of its accessibility, an industrial education audio-visual center (audio-visual sub-center) should make a significant contribution to the teaching-learning process in the department.

When instructional media are not close at hand there is a tendency not to use them. When this is the case the learning that could take place, or be improved, often suffers as a consequence. Many instructors do not put forth effort to acquire the materials needed to do an effective teaching job. The likelihood that what is required will be used is much greater if it is easily accessible. The jury response was 69 percent in "strong agreement" with this criterion; the remaining 31 percent "agreed."
Criterion 2: The person responsible for instructional media in the department should have had formal courses, and practical experience in the development and use of audio-visual materials.

Unless a person has had formal courses and practical experience in the development of instructional media, it is virtually impossible for him to do an effective job in assisting other instructors and in giving instruction to students in this area. One does not "pick up" such knowledge and skills any more than one "picks up" the practice of law or medicine. The person who has responsibility for the media should be professionally oriented. He would then be concerned with the solution of educational problems. It is significant that 81 percent of the jury members "strongly agreed" with this criterion, and the remainder "agreed" with it.

Criterion 3: Occasional use of audio-visual equipment is not an adequate substitute for an organized program for instructional media development and use.

There must be an active organized program in the development and use of the media. There are implications here for curriculum and course planning. If there is no planning and only mere passive interest in the media, the needs of the students are neglected. Sixty-three percent of the jury "strongly agreed" with this criterion, and the remaining 37 percent "agreed."
Criterion 4: Although instructional media may be available from other sources (e.g., a college or university audio-visual center), it is necessary for the department to have a fully equipped sub-center for use in teaching, and giving instruction in the use of the media.

It is necessary for the industrial education department to have its own center for the basic media of instruction. This does not preclude the need for the college or university center. The outstanding advantage of a sub-center is the accessibility and convenience for both teaching courses in the curriculum and for use by prospective teachers.

Thirty-one percent of the jury "strongly agreed" with this criterion; 31 percent "agreed," and 38 percent "disagreed." One of the jurors who "disagreed" commented: "A sub-center available, yes but highly specialized equipment may be located only in a central facility."

Administration of the Instructional Media Program

Criterion 1: A departmental instructional media unit should serve other departments whenever feasible.

This may not be the most desirable practice, but it may be a necessity in a small institution. The "loophole" in this criterion is "whenever feasible." However, it is assumed that the person responsible for the media would be interested enough in optimum learning situations and good
teaching habits to render assistance to those who request it, no matter with which department they may be affiliated. Six percent of the jury members "strongly agreed" with this criterion; 50 percent "agreed"; 31 percent "disagreed"; and 13 percent "strongly disagreed." It is possible that those who disagreed with this criterion were considering the staff time involved in rendering assistance to other departments. It is conceivable that a department chairman would want his personnel to devote their time to their own department exclusively.

Criterion 2: The frequency of use of audio-visual equipment is influenced by where it is stored, and the method by which it is distributed.

When equipment is not stored in a convenient place and the procedures for obtaining it are complicated and time-consuming, it will probably not be used very often. These factors coupled with others are major deterrents to the use of instructional media. Fifty-six percent of the jury "strongly agreed" with this criterion, and the remaining 44 percent "agreed" with it.

Criterion 3: Instructional media in the department should be issued by the person responsible for them.
It is the responsibility of the person in whose care the media are entrusted to issue them. This does not mean that a departmental coordinator, for instance, must personally hand out every piece of equipment and all of the materials requested. However, since this is a function of his office, he should have dependable, efficient persons employed to do it. When the responsibility is focused on an individual, the equipment is given better care and more efficient service is rendered. Thirty-eight percent of the jury "strongly agreed" with this criterion; 56 percent "agreed" with it, and 6 percent "disagreed."

Criterion 4: The original responsibility for selecting instructional media should be borne by individual instructors who use them.

No one can determine an instructor's needs better than the instructor himself. He knows what he is trying to communicate, and presumably he explores all possibilities in an effort to make learning optimally effective. If he is unfamiliar with the various media, it seems that he would seek the counsel of someone who is familiar with them. Fifty percent of the jurors "strongly agreed" with this criterion; 44 percent "agreed," and 6 percent "disagreed."

A possible reason for disagreement with this criterion is
that the respondents, who are administrators as well as teachers, believe that this responsibility should not be borne by instructors alone because of budgetary considerations. That is, they may believe that some instructors may select equipment and materials that are not needed for their particular situation.

Criterion 5: Audio-visual materials should be planned by the individuals who use them, and prepared by the departmental sub-center.

The specific needs of the individual are very much involved in this criterion. When an instructor knows what he needs, and the purpose for which he needs it, he can then go about the task of procuring it. In many instances he may plan and prepare the materials he needs. In the case of motion pictures or filmstrips it may be better to have the college or university audio-visual center to do the production. It may even be advisable for the director of the larger center to assist in the planning. This would be for the purpose of technical advice or consultation. Twenty-five percent of the jurors "strongly agreed" with this criterion; 44 percent "agreed," and 31 percent "disagreed."

A possible reason that so many "disagreed" is because they believed that all of the media should be planned and prepared by individuals who use them. Because of the technological complexity and time considerations, this may be impossible in many cases.
Criterion 6: The department should have a regular program for informing the faculty of new developments in instructional media, and for training them in their utilization.

The faculty may be kept up to date on new developments through memorandums, demonstrations, workshops, and discussion at departmental faculty meetings. In this way their interest is kept alive and they can add new skills and knowledge to what has already been acquired. Sixty-nine percent of the jury members "strongly agreed" with this criterion, and the remaining 31 percent "agreed."

Criterion 7: The teaching load should be adjusted to permit sufficient time for the person responsible for the audio-visual program to perform his duties adequately.

There are varying factors here; it is possible that the person responsible for the program would have no teaching duties. Furthermore, the number of classes assigned to an audio-visual coordinator may be few. The total number of students in the department may be a determinant. Seventy-five percent of the jury members "strongly agreed" with this criterion, and the remaining 25 percent "agreed."

Criterion 8: The services of a clerk and/or secretary are necessary for the efficient operation of an instructional media program.
The comment of one juror on this criterion was: "Depends on size of department. Should have services of secretary available." The comment of another was: "plus other specialized personnel." The services of these personnel are necessary for many of the routine, time-consuming tasks that the person responsible for the media would have to contend with. Of particular importance is the ordering of materials, scheduling of equipment, and maintenance of files on materials and equipment. Fifty-six percent of the jury members "strongly agreed" with this criterion; 31 percent "agreed," and 13 percent "disagreed." A possible reason for disagreement is the additional expenditure from the total departmental budget.

Development, Acquisition, and Use of Instructional Equipment

Materials and Methods

Criterion 1: (a) Instructional materials should be acquired from a variety of sources.

It is necessary to have a balanced program of methods and a variety of materials. In order to do this it is often necessary to purchase materials from off campus, rent them from on and off campus, and have some prepared by a campus
facility. Seventy-five percent of the jury "strongly agreed" with this criterion, and the remaining 25 percent "agreed."

(b) Instructional materials which are needed for a unique instructional situation, should be prepared by a campus facility, if feasible.

The most important consideration here is that when materials are prepared by a campus facility there is a greater likelihood that exactly what is needed will be produced. In addition, if there is a change in needs, or modifications must be made, they can be effected with much greater facility. Thirty-eight percent of the jurors rated this criterion "strongly agree"; 50 percent "agree," and 13 percent "disagree."

(c) Instructional materials such as motion pictures and filmstrips, are used more often than others because of their nature and availability.

Motion pictures and filmstrips are produced in greater abundance than many of the other materials; this accounts largely for their high utilization. The greater the quantity to select from, the easier it is to find what is needed for a particular situation. The realism of motion pictures, and the adaptability of filmstrips further increases their potentialities in learning situations. Nineteen percent of the
jury members "strongly agreed" with this criterion; 69 percent "agreed" and 13 percent "disagreed." A possible reason for the disagreement was the wording of the statement. There are several ideas embodied therein, and its meaning could easily be misinterpreted.

(d) Instructional materials and methods of all types should be used in industrial education.

Some instructional materials and methods are used more frequently than others. The demonstration, for instance, is used more frequently than dramatizations. This does not mean that the latter is never used. All types of materials can be used if the instructor is alert and imaginative. The use of imagination is not necessarily a natural gift. With some it may be, but with others it is a skill that must be practiced to be acquired. Seventy-five percent of the jury members "strongly agreed" with this criterion; 19 percent "agreed," and 6 percent "disagreed." It is possible that 6 percent of the jurors disagreed with this criterion because of the vague manner in which it was worded. It may be restated to read "instructional materials and methods should be used in industrial education to enable students to develop skills, acquire information pertinent to the subjects being studied,
and to instill within them the desire to use their talents to the limits of their abilities."

Criterion 2: Equipment and materials should be available for student teachers preparing for, or carrying out teaching assignments.

It has often been stated that "one teaches as he is taught, not as he is taught to teach." There is some truth in this; particularly during the early stages of his teaching career, a teacher tends to imitate his former teacher. Therefore, it is of especial importance that he learn correct methods when he is being prepared for the profession. Instructional materials and equipment should be used regularly and thoughtfully in the pre-service preparation program and in the student teaching situation. It is true that the college or university has limited control over the latter, but complete control over the former. Eighty-one percent of the jury members "strongly agree" with the criterion, and the remaining 19 percent "agree."

Criterion 3: Equipment should be selected through a combination of methods (e.g., catalogs, committee recommendations, and demonstrations by salesmen).

When equipment is selected through several methods, there is a greater likelihood that what is most apt for a
particular teaching situation will be acquired. The recommendation of a committee, coordinated with the counsel of the college or university audio-visual director is one of the best methods of selection. Demonstrations by salesmen, and selection from the catalog have limited, but useful value. It is natural that a salesman will emphasize the favorable aspects of his product, while overlooking its limitations. The catalog is helpful when the decision is being made by a person who is familiar with the equipment and materials being selected. This criterion was rated "strongly agree" by 44 percent of the jury members, and "agree" by the remaining 56 percent. Extreme care should be taken when selecting equipment. This involves astute judgment on the part of those making the selections. Therefore, this criterion could be stated to read "equipment should be selected through a judicious combination of methods (e.g., catalogs, committee recommendations, and demonstrations by salesmen).

Criterion 4: Within reasonable limits, equipment should be serviced and repaired by the person who is responsible for instructional materials.

Considerable time can be saved when minor repairs are made locally. This may include replacing lamps, repairing
cords, and lubrication where necessary. An inspection should be made of the equipment on a regular basis. This duty could be assigned to an assistant appointed by the person responsible for the media in the department. Forty-four percent of the jurors "strongly agreed" with this criterion; 31 percent "agreed"; 13 percent "disagreed," and 13 percent "strongly disagreed." A possible reason for the high percentage of disagreement is the wording of the criterion. The implication is that the person responsible for the media would be the one who would actually perform the duties of maintenance. This may or may not be the case. One juror added "or his designated representative." This criterion might well be amended to read "within reasonable limits, equipment should be serviced and repaired by the person who is responsible for instructional materials, or his designee."

Criterion 5: Equipment should be tested on a "trial" basis before being purchased.

The major advantage of testing equipment on a "trial" basis is that of determining if it will suit the particular needs for which it is being considered. Another is that its quality, or stated standards of performance may be observed.
Fifty-six percent of the jury members "strongly agreed" with the criterion; 38 percent "agreed," and 6 percent "disagreed."

Criterion 6: When feasible, a sufficient quantity of equipment, such as projectors, should be kept on hand for the sole and immediate use of the department.

When sufficient equipment is kept on hand for use in the department many problems involved in the use of the media are eliminated. This is closely related to the problem of accessibility. When equipment is close at hand the likelihood that it will be used is favorable. Further, having it in the department provides opportunities for instruction in its use to students in preparation, and to instructors who need it. Sixty-three percent of the jury "strongly agreed" with the criterion, and 38 percent "agreed."

Criterion 7: Films should be selected for their appropriateness to the topic being studied at the time.

The use of motion pictures for instructional purposes should never be abused by being selected for entertainment or as "time fillers." They should be closely coordinated with the course content. There are many problems that may arise in connection with the scheduling of films, but many
can be avoided by careful planning well in advance of the time they are needed. This criterion was "strongly agreed" with by 87 percent of the jury members, and "agreed" with by the remaining 13 percent.

Criterion 8: Motion pictures and filmstrips should be previewed by faculty members prior to being shown to their classes.

The positive attitude toward this criterion was nearly unanimous. Ninety-four percent of the jury members "strongly agreed" with it, and the remaining 6 percent "agreed." A likely reason for the favorable response is that the statement is practically axiomatic. If an instructor has not previewed his material he may find upon showing that it is not what is wanted or needed to teach a concept or series of concepts. The time of all concerned would be wasted. Even worse, the showing of the material may create unnecessary confusion in the minds of the students. After previewing, if it is found that a film or filmstrip is not suitable, it is preferable to return it to its source rather than show it.

Criterion 9: Prior to the showing of a motion picture, the class should be told the important things to look for during the running.

When this is done it involves the class in the learning situation. Here is an opportunity for the students to
establish a relationship between what has gone on previously and what they are viewing. The tendency toward passive viewing is diminished. Eighty-one percent of the jury members "strongly agreed" with this criterion, and 19 percent "agreed."

To avoid the idea that the instructor always tells his students what to look for prior to the running of a motion picture, the criterion may be restated to read "prior to the showing of a motion picture, the class should be told the important things to look for during the running if the material presented is unusually complex."

Criterion 10: Time should be allowed for discussion immediately after the showing of a film or filmstrip.

When time is allowed for this purpose the learning possibilities are enhanced. In some instance it may be advisable to give a brief test immediately after the showing to see if important principles or major concepts were grasped. If this is to be done, the class should be told of it in advance. Indeed it should be a part of the briefing process. Sixty-nine percent of the jury "strongly agreed" with the criterion, and 31 percent "agreed."

Criterion 11: Catalogs of commercially produced materials should be available for use by faculty members.
One of the best methods of finding out what is available in an area is the most recent catalogs of materials produced by commercial firms. These should be available to, and used by faculty members. Sixty-nine percent of the jury members "strongly agreed" with the criterion, and 31 percent "agreed."

Criterion 12: When feasible, television circuits should be available for use in classrooms and laboratories (shops).

The reaction to this criterion was favorable, but not as strong as one may expect. Forty-four percent of the jurors "strongly agreed," and 56 percent "agreed." The use of television in industrial education is not widespread. It seems that, to some degree, there may be a lack of foresight on the part of those who are in a position to change the situation. The medium has gained wide acceptance in other professional areas where skills are taught—in medicine, for instance. In industrial education it could serve as one means of keeping abreast of developments in the ever-changing industrial technology. It is possible that educational television could be used in place of the field trip
for presenting certain ideas and skills. In terms of time and money, it may not always be feasible to visit industries and museums. Educational television could help to fill the void.

Criterion 13: It is desirable to have large-screen television equipment available for use.

The outstanding advantage of this is to have televised material shown to large audiences; another advantage may be to reduce the number of standard-size receiving sets. Only 6 percent of the jury members "strongly agreed" with this criterion; 88 percent "agreed," and 6 percent "disagreed."

Criterion 14: Educational television, and films, should be used for teaching professional courses, related information subjects, and manipulative skills.

These media are integral parts of a balanced program. In many situations television is not available, but films have been used widely for years. It is possible to use both media for the purposes stated above. One jury member encircled the word "should" and commented "can where appropriate." Another questioned the use of these media for the teaching of manipulative skills, and wrote: "solely--no--as an adjunct yes." Twenty-five percent of the panel "strongly agreed" with the criterion; 63 percent "agreed," and 12 percent "disagreed."
Criterion 15: Motion pictures of live demonstrations given by faculty members, should be made for future reference by students.

Motion pictures made for this purpose could serve as resource or review materials. A well-planned and executed demonstration could be used many times by students who need additional instruction for the learning of a difficult skill. Nineteen percent of the jury members "strongly agreed" with the criterion; 63 percent "agreed," and 19 percent "disagreed." One juror suggested that video tape could be used as an alternative to motion pictures. Another commented: "Not enough experimentation to determine the value of such."

Criterion 16: Still pictures of processes, and projects completed by students, should be used for instructional purposes.

Any means that will increase learning should be utilized. Frequently a student will complete a project of outstanding quality; when it is displayed it may help in the motivation of other students. Similarly, pictures of the steps involved in a process may enhance a learning situation. An outstanding advantage of still pictures is that they are easy to make, and they can be referred to as many times as desired without the use of equipment. One jury member commented: "If they fit a specific plan of instruction." Another added: "If
nothing better is available." Thirteen percent of the panel "strongly agreed" with the criterion; 81 percent "agreed," and 6 percent "disagreed."

Criterion 17: The teacher education department should assist in the preparation of materials for student teachers.

The assistance given in this situation could be in the form of suggestions and criticisms. It is assumed that each student teacher will have had instruction in the development and use of instructional media. It would be a poor reflection on the teacher education institution if a student were placed in a school with a full array of instructional media, and being expected to use them, did not know how. Twenty-five percent of the jury members "strongly agreed" with this criterion; 63 percent "agreed," and 12 percent "disagreed."

Instruction in Development and Use of Instructional Media

Criterion 1: Pre-service teacher education students should be required to take instructional media courses.

The requirement to take instructional media courses would help to make future teachers aware of the existence and value of instructional materials. Such a requirement would likely meet opposition from some quarters because of the time factor
involved and of schedules that are already overcrowded.
Thirty-eight percent of the jury members "strongly agreed" with this criterion, and 63 percent "agreed."

Criterion 2: When there are no requirements, they should be encouraged to elect them.

One juror commented: "If they have electives." Obviously, at some institutions schedules are so rigidly structured that electives cannot be taken. However, where electives are permitted, one of the best investments of time would be in audio-visual instruction. It would be repaid many fold in future teaching experiences. Forty-four percent of the jury "strongly agreed" with the criterion, and 56 percent "agreed."

Criterion 3: If it is not feasible for prospective teachers to get instruction in the use of instructional media in courses, some other means should be made available.

A much less desirable practice than providing instruction in regular courses is that of including audio-visual instruction in the methods courses in teacher education. When this is done there is the danger of trying to cover too much material in a short period of time, and consequently, the quality of instruction suffers. There is also the tendency to overemphasize the "how" and neglect the "why."
Forty-four percent of the jury members "strongly agreed" with the criterion, and 56 percent "agreed."

Criterion 4: These media should be utilized in courses in the professional education sequence.

One of the best places for re-emphasis of the importance of the media is in the professional education courses which are usually offered in the junior and senior years. The students should already have had considerable exposure to instructional methods and materials, but here, through practical application by instructors, their importance should be "driven home." This may mean that these instructors will have to devise some special materials for their courses.

Fifty-six percent of the jurors "strongly agreed" with the criterion, and 44 percent "agreed."

Criterion 5: Careful consideration should be given to accepted theories of learning and instruction in the selection and use of instructional media.

If the theories of learning and instruction are ignored, the outcomes of the learning experience will be left to chance. For this reason, it is particularly important for those who use the media to have had formal courses in their use and development, and to have studied how intricately learning theories are involved. Fifty-six percent of the jury members "strongly agreed" with the criterion, and 44 percent "agreed."
Criterion 6: If they are used correctly, audio-visual media may make field trips more meaningful.

Motion pictures shown before and after visiting a particular plant or industry can serve to create interest and provide background information. Filmstrips, slides, video tape, and programmed instruction may be coordinated with field trips. This criterion was rated "strongly agree" by 50 percent of the jury members, and "agree" by 50 percent.

Criterion 7: Plans should be made for the use of instructional media when the curriculum is developed or revised.

Instructional materials are important enough to the learning process to be considered as major factors in helping to make a curriculum strong. It naturally follows that when the "what" to teach is decided, the "how" and "why" should also be decided upon. When the curriculum is planned or revised, and time is being allotted for the required course, audio-visual education should be included. This instruction should be separate from the regular methods courses. Sixty-three percent of the jury members "strongly agreed" with this criterion, and 38 percent "agreed."

Criterion 8: To keep abreast of new developments, the industrial education department should subscribe to several periodicals in the field of instructional media.
It has been said that "the only thing constant about technology is change." The technology of instruction is ever-changing. An instructor in the present-day college or university cannot afford to lag behind the developments. One of the best ways to keep abreast is by reading current literature on research and developments in a given area. There is much to be gained when the industrial education department subscribes to Audio-visual Instruction, Audio-Visual Communication Review, and Educational Screen and Audio-Visual Guide. Thirty-eight percent of the jury "strongly agreed" with the criterion, and 63 percent "agreed."

Facilities for Instructional Media

Criterion 1: A special room(s) or auditorium should be equipped for the showing of projected materials.

This is useful for large classes or special occasions. The frequency of use would be a major factor in determining the amount and type of equipment to be installed. Twenty-five percent of the jury members "strongly agreed" with the criterion; 50 percent "agreed," and 25 percent "disagreed." It is conceivable that the reason so many jury members "disagreed" is because of the way they may have interpreted the statement. One juror commented: "Every teacher needs these
materials and there are not enough special rooms available."
The intention was not to convey the meaning that projected materials should be shown in a special room only.

Criterion 2: The room(s) or auditorium used for projections should be acoustically treated.

The main reason for having a room, such as one used for projections, acoustically treated is to improve the sound within the room. Another reason is to dampen the sound so that persons outside the room would not be disturbed by the audible signals emanating therefrom.

Criterion 3: The problem of adequately darkening the laboratory (shop) may make it unsuitable for projected materials.

This is a major hindrance to the showing of projected materials in the industrial laboratory. However, the recent development of rear-screen projection has tended to minimize the problem. Even without rear-screen projection, light-tight Venetian blinds may be sufficient. Thirteen percent of the jury members "strongly agreed" with the criterion; 56 percent "agreed," and 31 percent "disagreed."

Criterion 4: Built-in display cabinets should be located in prominent positions where they can be viewed by a maximum number of people.
This depends on the purpose for which the cabinets are to be used. If they are used for "promotion" only, it is just as well that they should not be there. If their ends are educational, and contribute to those objectives, then they should be placed where they can be viewed by the maximum number of students. Sixty-three percent of the jury members "strongly agreed" with the criterion, and 38 percent "agreed."

Criterion 5: A photographic darkroom should be located in the department.

It is desirable to have such a room in the department if a large number of pictures are used in instruction. Furthermore, a darkroom provides an opportunity for pre-service teachers to learn the basic techniques of photography. This skill would be of inestimable value to the teacher in the classroom. The jury reaction to the criterion was mixed. Thirty-eight percent of the members "strongly agreed"; 50 percent "agreed"; 6 percent "disagreed," and 6 percent "strongly disagreed."

Criterion 6: A departmental film library increases the probability of motion pictures being used by the faculty.
This relates to the previously stated problem of accessibility. When films are there in the department and can be procured without delay and without a complicated procedure, the likelihood that they will be used is greatly increased. Thirty-one percent of the jury members "strongly agreed" with the criterion, and 69 percent "agreed."

Criterion 7: A special room for previewing projected materials should be located in the departmental audio-visual sub-center.

This depends to a large extent on the "flow of traffic" through the room in which materials are projected for the final showing. However, it is assumed that all instructors would use the media frequently, and there would be a need for a special previewing room. Thirty-one percent of the jury "strongly agreed" with the criterion; 50 percent "agreed," and 19 percent "disagreed."

Criterion 8: Storage space for all types of instructional materials and equipment should be provided in the sub-center.

Provisions should be made for adequate storage of the instructional media in a departmental center. Not only should the proper care and maintenance of it be considered, but the security also. Fifty-six percent of the respondents "strongly agreed" with the statement; 38 percent "agreed," and 6 percent "disagreed."
Budgetary Aspects of the Instructional Media Program

Criterion 1: Audio-visual equipment and materials should be financed from departmental funds.

This is an acceptable practice when sufficient funds are included in the total budget for the department. The needs should be estimated before submitting the budget. It may be feasible to have funds from a separate source for initial purchases of equipment and materials. Nineteen percent of the jury members "strongly agreed" with the criterion; 56 percent "agreed," and 25 percent "disagreed." Those who disagreed may have believed that expenditures for audio-visual equipment and materials would tend to reduce the amount allotted for other departmental needs.

Criterion 2: The adequacy of funds for instructional media should be determined by the instructional program, the number of students enrolled, and the frequency of use of materials and equipment.

These factors are considered when funds are allotted for any aspect of the instructional program. One exception may be the frequency of use of the media. When they are acquired it should be understood that they will be incorporated into the total program, and used on a regular and frequent basis. Thirty-one percent of the jury members "strongly agreed" with the criterion, and 69 percent "agreed."
Criterion 3: Based on compiled requests from individual faculty members, orders for instructional materials should be placed with suppliers ninety days prior to the time they are needed.

The opinions of the jurors were widespread on this criterion. Six percent "strongly agreed" with it; 63 percent "agreed"; 19 percent "disagreed," and 13 percent "strongly disagreed." The method for ordering materials depends largely on the situation at a particular institution. Sufficient time should be allowed, however, so that they will arrive by the time they are needed.

Evaluation of the Instructional Media Program

Criterion 1: Research should be carried on concerning increased utilization of audio-visual media in industrial teacher education.

Continuous research is necessary for growth and improvement in any area. There has been some research in the utilization of the media in industrial teacher education, but it is far from sufficient. There are many teaching devices on the market, but there is some question as to the best ways in which they can be utilized. Research would provide some of the answers. Thirty-one percent of the jury members "strongly agreed" with the criterion, and 69 percent "agreed."
Criterion 2: (a) Teacher educators make optimum use of the instructional media when the media are readily available.

There are many factors, but availability is very important in the use of the media. The fact that they are readily available does not guarantee their usage by teacher educators, but it does greatly increase the likelihood. Sixty-nine percent of the jury members "strongly agreed" with this criterion; 25 percent "agreed," and 6 percent "disagreed."

(b) Teacher educators make optimum use of the instructional media when they have had instruction in their use.

A teacher feels uncomfortable when he attempts to utilize the unfamiliar. If he does not know how to use the media, he will cling to traditional methods regardless of the fact that the learning derived through them may be limited. Fifty-six percent of the jury members "strongly agreed" with the criterion, and 44 percent "agreed."

(c) Teacher educators make optimum use of the instructional media when scheduling difficulties are minimized.

Not only does scheduling involve time, but it also involves coordination and amounts of equipment available. If the necessary media are not available at the time they are
needed, one tends to become discouraged and avoid future attempts at scheduling. Sixty-three percent of the jury members "strongly agreed" with the criterion, and 38 percent "agreed."

(d) Teacher educators make optimum use of the instructional media when they are aware of the materials that are pertinent to their specific areas.

When a teacher knows that materials have been developed in his area of specialization, and are available for use, he will tend to utilize them in his program. There are various means for becoming acquainted with these materials—trade publications, professional periodicals, professional meetings and consultations with staff members. Sixty-three percent of the jury members "strongly agreed" with this criterion, and 38 percent "agreed."

(e) Teacher educators make optimum use of the instructional media when they understand their value.

Some teacher educators regard the media as "gadgetry," "passing fads," or at most as "adjuncts" to teaching methods. There is need to clear up much of the misunderstanding. The sole purpose for which instructional media should be used is to enhance the learning process—to increase understanding,
to make learning more meaningful, and to accelerate the rate and amount of learning. When teacher educators realize that the best instructional media are soundly based on learning theory, fuller use will be made of them. Sixty-three percent of the jury members "strongly agreed" with the criterion, and 38 percent "agreed."

Criterion 3: Utilization of the media of instruction is likely to increase in the future.

Indications that utilization of the media is likely to increase are very strong. The quality and variety of materials and equipment has increased, and will likely continue to do so; learning theorists and educators are continuing critical research studies; increased enrollments will demand innovations in teaching methodology; and the increasing accumulation of knowledge will have implications for media utilization. Sixty-nine percent of the jury members "strongly agreed" with the criterion, and 31 percent "agreed."

Summary

In this chapter the criteria for evaluating a program of utilization of instructional media in industrial teacher education have been established. These standards were used
as a basis for a questionnaire which was mailed to 150 selected teacher education institutions throughout the United States. The criteria will also be used in part to serve as a guide for the projection of a program at Tuskegee Institute.

The seven major categories under which the data were grouped are: (1) Background Information; (2) Administration of the Instructional Media Program; (3) Development, Acquisition, and Use of Instructional Equipment, Materials and Methods; (4) Instruction in Development and Use of Instructional Media; (5) Facilities for Instructional Media; (6) Budgetary Aspects of the Instructional Media Program; and (7) Evaluation of the Instructional Media Program.

In Chapter IV the data of the questionnaires returned from the selected colleges and universities will be presented. This chapter will also contain data collected on personal visits to five universities in four midwestern states.
CHAPTER IV

PRESENTATION AND INTERPRETATION OF DATA

This chapter contains data from 110 questionnaires returned from selected colleges and universities throughout the United States, from personal interviews with industrial education department chairmen, or their designees, at five midwestern universities, and from observations made at these universities.

The total number of questionnaires mailed was 150. Of these, 113, or 75.3 percent were returned. Three of the 113 could not be used in the study for various reasons. The instrument, which was adapted primarily from one developed and circulated by the Teacher Education and Media Project of the American Association of Colleges for Teacher Education in 1964, and partially from the one used in Swartout's study, was validated by sixteen leaders in industrial education, as reported in the preceding chapter.

\[1\text{Swartout, p. 319.}\]
The questionnaire was broadly constructed to include a variety of institutions and organizational patterns. For this reason, many of the items did not apply to some situations.

The data in this chapter will be presented in two main parts. The first part will be concerned with the questionnaire and interpretations; the second with interviews and observations. The universities visited were Michigan State University, Purdue University, Stout State University, the University of Illinois, and Wayne State University. Because of the promise to the interviewees that the data would be treated confidentially, the universities will be referred to in a general way, and by the code letters of A, B, C, D, and E.

Where applicable, the figures in the data that follow have been rounded off to the nearest whole number. The term "department" and "industrial education department" will be used interchangeably throughout this chapter.

Part I - Data and Interpretations from Questionnaires

Background Information

Although Table 2 indicates that 12 percent of the institutions reported they do not have a college or university
TABLE 2

INSTITUTIONS WITH COLLEGE OR UNIVERSITY AUDIO-VISUAL CENTERS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>97</td>
<td>88</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>

N: 110

audio-visual center, this does not necessarily mean that industrial education department at these institutions do not have access to, nor make use of instructional media.

In some cases where there is no center for a college or university, the media program is administered through a separate unit, such as a college or department. The fact that 88 percent of the responding institutions reported that they do have a centralized facility shows that this type of organization is more prevalent.

The data in Table 3 show that 24 percent of the responding institutions have an audio-visual center for their
TABLE 3
INSTITUTIONS WITH AN AUDIO-VISUAL CENTER
FOR COLLEGE OF EDUCATION

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>No</td>
<td>84</td>
<td>76</td>
</tr>
</tbody>
</table>

N: 110

college of education. A comparison of this data with that in Table 2 indicates that some also have a center for the college or university.

No effort was made in this study to determine the adequacy of this arrangement for the industrial education department. However, if it is well organized and administered, it seems plausible that it could very well provide for the needs of the industrial education department as well as for the needs of other departments in the college of education.
Thirty-one percent of the institutions surveyed responded that they had an audio-visual center for the industrial education department. The results are tabulated and reported in Table 4. A possible reason for 69 percent giving a negative answer to the question is that the industrial education department at many institutions is served by the center operated for the college of education, or directly by a college or university center.

Eleven percent of the institutions surveyed indicated that audio-visual equipment is located in the industrial education department, but there is not a complete center. The results are reported in Table 5.

### TABLE 4

**INSTITUTIONS WITH AN AUDIO-VISUAL CENTER FOR INDUSTRIAL EDUCATION DEPARTMENT**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>34</td>
<td>31</td>
</tr>
<tr>
<td>No</td>
<td>76</td>
<td>69</td>
</tr>
</tbody>
</table>

N: 110
Table 5

Institutions with audio-visual materials and equipment in industrial education department, but not having a complete center there

<table>
<thead>
<tr>
<th>Responses</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>No</td>
<td>98</td>
<td>89</td>
</tr>
</tbody>
</table>

N: 110

Eighty-five percent of the institutions reported that the person responsible for instructional media has had formal courses in the development and use of audio-visual materials. Table 6 shows the compiled results.

Table 6

Institutions at which person responsible for instructional media has had formal courses and practical experience in the development and use of audio-visual materials

<table>
<thead>
<tr>
<th>Responses</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>94</td>
<td>85</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>15</td>
</tr>
</tbody>
</table>

N: 110
It is possible that this question was misinterpreted by some of the respondents because of the way it was worded. No distinction was made as to whether or not "the person responsible" referred to someone in the industrial education department, or to someone in the college or university audio-visual center. It can be taken for granted that the person responsible for instructional media in an institution's center has had formal courses in the field, but this may not be the case in a departmental unit.

Table 7 shows the results of the responses to the question on the ready availability of media not located in the industrial education department. Ninety-one percent of the institutions responded that the media are available from other sources; 6 percent indicated they are not available, and 3 percent replied that the question is not applicable to their particular situation.

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>100</td>
<td>91</td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Not applicable</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

N: 110
Administration of the instructional media program

Twenty percent of the institutions surveyed replied that the departmental audio-visual unit serves other departments; 61 percent responded that the department does not serve other units, and 19 percent indicated the question is not applicable to their particular situation. These results are reported in Table 8.

TABLE 8
STATUS OF SERVICE OF DEPARTMENTAL AUDIO-VISUAL UNIT TO OTHER DEPARTMENTS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serves other departments</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Does not serve other departments</td>
<td>67</td>
<td>61</td>
</tr>
<tr>
<td>Not applicable</td>
<td>21</td>
<td>19</td>
</tr>
</tbody>
</table>

N: 110

The data with regard to storage and distribution of audio-visual equipment are presented in Table 9. Central storage and distribution of equipment to instructors on a
TABLE 9

STORAGE AND DISTRIBUTION OF AUDIO-VISUAL EQUIPMENT

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment is centrally stored and distributed to instructors on a per-use basis</td>
<td>84</td>
<td>76</td>
</tr>
<tr>
<td>Equipment is decentralized by classrooms or laboratories (shops)</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Equipment is checked out to individual instructors and/or departments on a long-term basis</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Equipment is distributed by means other than the above</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

N: 110

per-use basis was indicated by 76 percent of the respondents. This compares favorably with the total response to the question on the existence of audio-visual centers at the colleges and universities studied. Ten percent of the responding institutions indicate that equipment is decentralized by classrooms or laboratories (shops). At 5 percent of the institutions equipment is checked out to individual instructors and/or departments on a long-term basis. One percent
of the respondents indicated that equipment is distributed by means other than those stated. One percent replied that the question was not applicable to their particular situation, and 6 percent did not respond to any part of the question.

Table 10 shows that 13 percent of the 110 institutions reported that some of the audio-visual equipment is centrally stored and distributed to instructors on a per-use basis, and some is decentralized by classrooms or laboratories (shops). Twenty-seven percent indicated that some

**TABLE 10 —**

INSTITUTIONS USING A COMBINATION OF METHODS FOR STORAGE AND DISTRIBUTION OF AUDIO-VISUAL EQUIPMENT

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some equipment is centrally stored and distributed to instructors on a per-use basis, and some is decentralized by classrooms or laboratories (shops)</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Some equipment is centrally stored and distributed to instructors on a per-use basis, and some is checked out to individual instructors and/or departments on a long-term basis</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>Other methods are used for storage and distribution of equipment</td>
<td>56</td>
<td>60</td>
</tr>
</tbody>
</table>

N: 110
of the equipment is centrally stored and distributed to instructors on a per-use basis, and some is checked out to individual instructors and/or departments on a long-term basis. Either of these arrangements has the potentiality of increasing the utilization of instructional media, and thereby enhancing the learning situation. In some areas of study there are more materials available, e.g. commercially produced self-instruction programs, films, filmstrips, etc., than in others. Therefore, there is a greater need for some areas to have more equipment readily available to present these materials. Sixty percent of the respondents did not indicate that a combination of methods is used for storage and distribution of equipment.

Data on the responsibility for issuing instructional media is reported in Table 11. Forty-one percent of the institutions indicated they are issued by an instructional materials coordinator; 9 percent reported that the media are issued by audio-visual technicians; 16 percent indicated that student assistants are employed for this purpose; 21 percent replied that the media are issued by persons
TABLE 11
RESPONSIBILITY FOR ISSUING INSTRUCTIONAL MEDIA

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional media are issued by an instructional materials coordinator</td>
<td>45</td>
<td>41</td>
</tr>
<tr>
<td>Instructional media are issued by audio-visual technicians</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Instructional media are issued by student assistants employed for this purpose</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Instructional media are issued by persons other than the above</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>

N: 110

other than those listed, and 13 percent did not respond to any part of the question. It is possible that this question was misinterpreted by many of those responding. The fact that 13 percent of the respondents did not answer any part of the question may indicate that it was not worded clearly. For the "persons other than the above" category, the responses included "individual instructors" more than any other. Additional responses were "librarian," "qualified clerical help," "secretary," and "full time employees."
Seventy-seven percent of the responding institutions indicated that the original responsibility for selecting instructional media is borne by individual instructors who use them as indicated in Table 12 below. Five percent

**TABLE 12**

**ORIGINAL RESPONSIBILITY FOR SELECTION OF INSTRUCTIONAL MEDIA**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original responsibility for selecting instructional media is borne by individual instructors who use them</td>
<td>74</td>
<td>67</td>
</tr>
<tr>
<td>Original responsibility for selecting instructional media is borne by department heads</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Original responsibility for selecting instructional media is borne by an instruction committee</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Original responsibility for selecting instructional media is borne by a departmental coordinator after consulting with a selection panel</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Original responsibility for selecting instructional media is borne by combinations of the above</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Original responsibility for selecting instructional media is borne by someone other than the above</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

N: 110
indicated that it is borne by department heads. Only 1 percent reported this to be the responsibility of the instruction committee. Four percent reported that it is borne by a departmental coordinator after consulting with a selection panel. Eighteen percent indicated that the responsibility is shared by combinations of persons already mentioned. Two percent listed someone other than those on the questionnaire as having the responsibility. One percent indicated that the question was not applicable to their situation, and 4 percent of the respondents did not answer any part of the question.

Ninety percent of the respondents reported that audiovisual materials are planned by the individual instructors who use them as shown in Table 13. Five percent indicated

### TABLE 13

**RESPONSIBILITY FOR PLANNING OF AUDIO-VISUAL MATERIALS**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio-visual materials are planned by individual instructors who use them</td>
<td>99</td>
<td>90</td>
</tr>
<tr>
<td>Audio-visual materials are planned by instructor and other personnel</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Misinterpreted question</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

N: 110
that materials are planned by individual instructors cooperating with other personnel. Two percent of the respondents misinterpreted the question, and 3 percent did not respond to any part of it.

In response to the question on who prepares audio-visual materials, 5 percent of the institutions reported that they are prepared by a departmental coordinator. Fifteen percent indicated that the materials are prepared by the college or university audio-visual center. Forty-five percent of the respondents reported that the preparation of materials is done by individual instructors who use them. Twenty-eight percent indicated that audio-visual materials are prepared cooperatively by individual instructors and the college or university audio-visual center. Two percent reported that materials are prepared by someone other than the persons mentioned, and 5 percent did not respond to any part of the question. Some materials, such as models, mock-ups, and educational bulletin boards can be prepared by individual instructors with little difficulty, but for others it is necessary to have assistance from specialists in the audio-visual fields as shown in the following table.
TABLE 14
RESPONSIBILITY FOR PREPARATION OF AUDIO-VISUAL MATERIALS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio-visual materials are prepared by a departmental coordinator .....................................................................................................................................</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Audio-visual materials are prepared by the college or university audio-visual center ..................................................................................................................................</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Audio-visual materials are prepared by individual instructors who use them .......................................................................................................................................</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>Audio-visual materials are prepared co-operatively by individual instructors and the college or university audio-visual center ..................................................................................</td>
<td>31</td>
<td>28</td>
</tr>
<tr>
<td>Audio-visual materials are prepared by someone other than the above ..................................................................................................................................................</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No response to any part of question .................................................................................................................................................................................................</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

N: 110

Thirty percent of the responding institutions indicated that they have regular programs for informing the faculty of new developments in instructional media and for training them in their utilization. Negative answers were given by the remaining 70 percent as reported in Table 15.
TABLE 15

DEPARTMENTS WITH REGULAR PROGRAMS FOR INFORMING FACULTY OF NEW DEVELOPMENTS IN INSTRUCTIONAL MEDIA AND FOR TRAINING THEM IN THEIR UTILIZATION

<table>
<thead>
<tr>
<th>Responses</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>33</td>
<td>30</td>
</tr>
<tr>
<td>No</td>
<td>77</td>
<td>70</td>
</tr>
</tbody>
</table>

N: 110

Table 16 presents the varied responses from the colleges and universities on the question of the person responsible for instructional media having other duties. Thirteen percent of the participants gave "administrative duties" as additional duties performed by the person responsible for instructional media. The response from 21 percent of the institutions was "instructional duties." Only 1 percent gave "counseling duties" as additional ones for the person responsible for instructional media. Twenty-six percent of those responding indicated that the person
TABLE 16
OTHER DUTIES OF PERSON RESPONSIBLE FOR INSTRUCTIONAL MEDIA

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>The person responsible for instructional media has administrative duties</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>The person responsible for instructional media has instructional duties</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>The person responsible for instructional media has counseling duties</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>The person responsible for instructional media has a combination of the above duties</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>The person responsible for instructional media has duties in addition to the above</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Not applicable</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>31</td>
<td>28</td>
</tr>
</tbody>
</table>

N: 110

The person responsible for instructional media has a combination of the duties already mentioned. Five percent indicated the question was not applicable to their particular situation, and 28 percent of the respondents did not answer any part of the question.
Development, acquisition, and use of instructional equipment, materials, and methods

Data on the availability and use of instructional media are presented in Table 17. The column on the left gives the type of media on which the participants were questioned;

**TABLE 17**

**AVAILABILITY AND USE OF INSTRUCTIONAL MEDIA**

<table>
<thead>
<tr>
<th>Instructional Medium</th>
<th>Availability</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Motion pictures,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 mm sound</td>
<td>105</td>
<td>95</td>
</tr>
<tr>
<td>Kinescopes</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>Motion pictures, 8 mm sound</td>
<td>41</td>
<td>36</td>
</tr>
<tr>
<td>Filmstrips, sound</td>
<td>78</td>
<td>71</td>
</tr>
<tr>
<td>Filmstrips, silent</td>
<td>89</td>
<td>81</td>
</tr>
<tr>
<td>Transparencies, 2 x 2</td>
<td>80</td>
<td>73</td>
</tr>
<tr>
<td>Transparencies 3 1/4 x 4</td>
<td>39</td>
<td>35</td>
</tr>
<tr>
<td>Transparencies, overhead</td>
<td>92</td>
<td>84</td>
</tr>
<tr>
<td>Pictures, charts, and graphs</td>
<td>90</td>
<td>82</td>
</tr>
<tr>
<td>Recordings, disc</td>
<td>51</td>
<td>46</td>
</tr>
<tr>
<td>Recordings, audio tape</td>
<td>78</td>
<td>71</td>
</tr>
<tr>
<td>Recordings, video tape</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>TV programs, open circuit</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>TV programs, closed circuit</td>
<td>42</td>
<td>38</td>
</tr>
<tr>
<td>Radio programs</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>Programmed instruction materials</td>
<td>54</td>
<td>49</td>
</tr>
<tr>
<td>Live demonstrations</td>
<td>88</td>
<td>80</td>
</tr>
<tr>
<td>Field trips</td>
<td>95</td>
<td>86</td>
</tr>
<tr>
<td>Models and mock-ups</td>
<td>92</td>
<td>84</td>
</tr>
<tr>
<td>Displays and exhibits</td>
<td>91</td>
<td>82</td>
</tr>
<tr>
<td>Educational bulletin boards</td>
<td>94</td>
<td>85</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

N: 110
the next column has the number of institutions indicating
they have the medium available; the third column presents
the percentage of the responding institutions that indicated
they have the medium available; the fourth column has the
number of institutions that reported they use the medium
available, and the fifth has the percentage of the respond­
ing institutions using each medium available. It should
be noted that 16 mm sound motion pictures are most avail­
able and have the greatest amount of utilization.

Of other projected materials, overhead transparencies
rank next to motion pictures in both availability and util­
ization. A possible reason for this is because of the ex­
tensive use of this medium by instructors of drawing, which
is common to all areas involving the use of industrial
skills. Open circuit television ranks lowest of all the
media in terms of availability. A reason for this is the
lack of programs that are pertinent to the areas of study
in industrial education as well as the cost involved.

Of the newer media such as kinescopes, 8 mm sound
motion pictures, closed circuit television programs, video
tape recordings, and programmed instruction materials, the
latter has the greatest availability and the greatest util­
ization. The most plausible explanation for this is that
industrial teacher educators seem to be using this medium increasingly for the teaching of information subjects.

Five percent of the respondents to the questionnaire failed to answer any part of the question on availability and use of the media. It may have been overlooked, or it may have been ignored because of the complex manner in which it was constructed.

Data on the use of audio-visual materials and equipment by various personnel are presented in Table 18.

**TABLE 18**

**USE OF EQUIPMENT AND MATERIALS BY VARIOUS PERSONNEL**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment and materials are used only by the departmental faculty</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>Equipment and materials are used by the departmental faculty and</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>the faculty of other departments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment and materials are used by the departmental faculty and</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>student teachers preparing for, or carrying out teaching assignments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment and materials are used by all of the above</td>
<td>43</td>
<td>39</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Misinterpreted question</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>

N: 110
Eighteen percent of the responding institutions reported that equipment and materials are used by the departmental faculty only. Seven percent indicated that equipment and materials are used by the departmental faculty and the faculty of other departments. Twenty-two percent of the respondents reported that equipment and materials are used by the departmental faculty and student teachers preparing for, or carrying out teaching assignments. Forty-three percent of the institutions indicated that the media are used by the departmental faculty, the faculty of other departments, and student teachers. One percent replied that the question was not applicable to their particular situation. Ten percent did not respond to any part of the question, and 4 percent apparently misinterpreted it.

The data with regard to the methods of selecting audio-visual equipment are presented in Table 19. Two percent of the responding institutions reported that their method of selecting audio-visual equipment is through the use of catalogs distributed by manufacturers. Only 1 percent indicated that equipment is selected through published guides on equipment. At the institutions of 2 percent of the respondents, equipment is selected on the basis of recommendations of other faculty members. None of the colleges
TABLE 19

METHOD OF SELECTING AUDIO-VISUAL EQUIPMENT

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment is selected through catalogs of manufacturers . . .</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Equipment is selected through published guides on equipment .</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Equipment is selected through recommendations of other faculty members . . . . . . . . . . .</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Equipment is selected through demonstrations by salesmen . .</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Equipment is selected through a combination of methods . . .</td>
<td>99</td>
<td>90</td>
</tr>
<tr>
<td>No response to any part of question . . . . . . . . . . . . . . . . .</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

N: 110

and universities indicated they select equipment solely through demonstrations by salesmen. However, this method is used by some institutions in conjunction with other methods. It was reported by 90 percent of the institutions that equipment is selected through a combination of methods. Five percent of the respondents did not answer any part of the question.

Data on servicing and repairing of audio-visual equipment are presented in Table 20. Twenty-four percent of the
TABLE 20
SERVICING AND REPAIR OF AUDIO-VISUAL EQUIPMENT

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment is serviced and repaired by a faculty or staff member who is a specialist in audio-visual materials.</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>Equipment is serviced and repaired by student assistants</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Equipment is serviced and repaired by commercial concerns</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>Equipment is serviced and repaired by a combination of the above</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>Equipment is serviced and repaired by someone other than the above</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

N: 110

institutions indicated that equipment is serviced and repaired by a faculty or staff member who is a specialist in audio-visual materials. Two percent reported that repairs are made by student assistants. Twenty-one percent of the colleges and universities have equipment repaired by commercial concerns. Thirty-six percent reported that a combination of the methods mentioned are employed for servicing.
and repairs. Six percent of the participants failed to respond to any part of the question, and 1 percent indicated that the question is not applicable to their particular situation.

Although there are many variables to be considered, it seems almost axiomatic that a combination of methods must be used with regard to servicing and repairing of equipment. It is important that the servicing be carried out on a regular, systematic basis, and that repairs be taken care of promptly so that the equipment can be put back into use as soon as possible. Closely related to this is the need to have spare parts, and in some cases, spare equipment on hand in case of an emergency.

With regard to the testing of audio-visual equipment prior to purchasing it, Table 21 lists the responses of the institutions studied. Seventy-two percent answered affirmatively to the question on testing equipment on a "trial" basis prior to purchasing it. Twenty-two percent gave negative responses, and 6 percent indicated that this is sometimes done.
The data with regard to availability of equipment for projection of materials are presented in Table 22. Two percent of the respondents indicated that only projectors for 16 mm motion pictures are available for the sole and immediate use of departmental faculty members. None of the institutions indicated that only slide projectors are available for sole and immediate use. None reported that only filmstrip projectors are available. Seventy-six percent of the respondents indicated that all of the above-mentioned equipment is available for the sole and immediate use of departmental faculty members. Six percent reported that some is available; 3 percent indicated that none is available, and 10 percent of the respondents answered no part of the question.
<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only projectors for 16 mm motion pictures are available for the sole and immediate use of departmental faculty members</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Only slide projectors are available for the sole and immediate use of departmental faculty members</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Only filmstrip projectors are available for the sole and immediate use of departmental faculty members</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>All of the above equipment is available for the sole and immediate use of departmental faculty members</td>
<td>84</td>
<td>76</td>
</tr>
<tr>
<td>Some of the above equipment is available for the sole and immediate use of departmental faculty members</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Equipment other than the above is available for the sole and immediate use of departmental faculty members</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>None of the above equipment is available for the sole and immediate use of departmental faculty members</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

N: 110
Table 23 presents data on the question of the selection of films on the basis of appropriateness to the topic being studied at the time. Ninety-four percent of the institutions responded affirmatively; 5 percent gave negative responses, and 1 percent indicated that the question is not applicable to their particular situation. The high affirmative response indicates that it is the common practice to select materials on the basis of their relationship to the topic under study.

Data on the practice of previewing motion pictures prior to showing them to classes are presented in Table 24.

**TABLE 23**

**SELECTION OF FILMS ON BASIS OF APPROPRIATENESS TO TOPIC BEING STUDIED AT TIME**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>103</td>
<td>94</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

N: 110
Ninety-four percent of the colleges and universities responded affirmatively; 5 percent gave negative answers, and 2 percent gave answers other than "yes" or "no." Although this is a very desirable practice, an authority in audio-visual communications questions the high percentage of affirmative answers. It is possible that the respondents gave replies that indicate what they believe should be done.

**TABLE 24**

**PRACTICE OF PREVIEWING MOTION PICTURES PRIOR TO SHOWING**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>103</td>
<td>94</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Other responses</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

N: 110

Table 25 presents data on the practice of telling classes the important things to look for prior to showing a motion picture. Ninety-one percent of the respondents replied affirmatively to the question on the subject; 4 percent gave negative answers, and 5 percent gave answers other
TABLE 25

PRACTICE OF TELLING CLASSES IMPORTANT THINGS TO LOOK FOR PRIOR TO SHOWING OF MOTION PICTURE

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>100</td>
<td>91</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Other responses</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

N: 110

than "yes" or "no." The percentage of affirmative responses to this question are high, but opinions with regard to the practice are divided. It seems that students should be taught how to watch films so that they can discern for themselves what the important ideas are, and grasp them. When new and highly complex concepts are presented in a motion picture, the students should be told the important things to look for.

The data on the question of allowance of time for discussion immediately after the showing of a film or filmstrip are presented in Table 26. Ninety-three percent of the respondents answered "yes," 5 percent answered "no,"
TABLE 26
ALLOWANCE OF TIME FOR DISCUSSION IMMEDIATELY AFTER SHOWING OF FILM OR FILMSTRIP

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>102</td>
<td>93</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Other responses</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

N: 110

and 2 percent gave other responses. The latter were qualified "yes" answers. One respondent wrote "usually," another "generally," and a third who answered "yes" also wrote "always unless film is too long."

Four percent of the responding institutions reported that only catalogs of commercially produced motion pictures are available for use by faculty members. One percent indicated that only catalogs of filmstrips are available. None of the respondents reported that only catalogs of self-instructional materials are available. Fifty-two percent reported that catalogs of all of the above-mentioned materials plus others are available. Thirty-eight percent indicated that only catalogs of motion pictures and filmstrips
are available to faculty members. Five percent of the institutions failed to answer any part of the question. The results are presented in Table 27.

**TABLE 27**

**AVAILABILITY OF CATALOGS OF COMMERCIAL PRODUCED MATERIALS FOR USE BY FACULTY**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only catalogs of commercially produced motion pictures are available</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>for use by faculty members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only catalogs of commercially produced filmstrips are available for use</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>by faculty members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only catalogs of commercially produced programs for self-instructional</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>devices are available for use by faculty members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catalogs of all of the materials are available for use by faculty members</td>
<td>57</td>
<td>52</td>
</tr>
<tr>
<td>Only catalogs of commercially produced motion pictures and filmstrips</td>
<td>42</td>
<td>38</td>
</tr>
<tr>
<td>are available for use by faculty members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

N: 110
The data with regard to the question on the availability of television circuits for use in classrooms and laboratories (shops) are presented in Table 28. Twenty-seven percent of the respondents answered "yes"; 58 percent gave the reply of "no"; a percent answered "classrooms only"; 9 percent gave various other responses, and 3 percent indicated that the question is not applicable to their particular situation.

Table 29 presents data on the availability of large-screen television equipment. Eleven percent of the institutions indicated that this medium is available; 80 percent

### TABLE 28

AVAILABILITY OF TELEVISION CIRCUITS FOR USE IN CLASSROOMS AND LABORATORIES (SHOPS)

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>No</td>
<td>64</td>
<td>58</td>
</tr>
<tr>
<td>Classrooms only</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Other responses</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Not applicable</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

N: 110
TABLE 29

AVAILABILITY OF LARGE-SCREEN TELEVISION EQUIPMENT

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>No</td>
<td>88</td>
<td>80</td>
</tr>
<tr>
<td>Other responses</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Not applicable</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

N: 110

replied "no" to the question; 3 percent reported that the question is not applicable to their particular situation, and 6 percent gave various other responses. Large-screen television equipment is costly, and it is not found in the average teacher education institution. It is believed by an authority in the field of audio-visual education that the term "large-screen" may have been misleading to some of the respondents who replied affirmatively. They may have thought that the question referred to the ordinary receiving set.

Data with regard to the use of instructional television in conjunction with other materials and methods are presented in Table 30. Nine percent of the institutions indicated that this medium is used in conjunction with other
TABLE 30

EDUCATIONAL TELEVISION USED IN CONJUNCTION WITH OTHER MATERIALS AND METHODS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational television is used in conjunction with other materials and only for teaching professional sequence courses</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Educational television is used in conjunction with other materials and methods only for teaching related information subjects</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Educational television is used in conjunction with other materials and methods only for teaching manipulative skills</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Educational television is used in conjunction with other materials and methods for all of the above purposes</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Educational television is used in conjunction with other materials and methods for combinations of the above purposes</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Educational television is used in conjunction with other materials and methods for purposes other than the above</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Not applicable</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>74</td>
<td>67</td>
</tr>
</tbody>
</table>

N: 110
materials and methods only for teaching professional sequence courses. Three percent reported that it is used only for teaching related information subjects. Three percent answered that educational television is used in conjunction with other materials only for teaching manipulative skills. Seven percent indicated that it is used in conjunction with other materials and methods for all of the above-mentioned purposes. Six percent of the respondents replied that it is used in conjunction with other materials and methods for combinations of the above-mentioned purposes. Two percent answered that educational television is used in conjunction with other materials and methods for purposes other than those mentioned. Three percent answered that the question is not applicable to their particular situation, and 67 percent of the respondents did not answer any part of the question. A possible reason for such a high percentage of the institutions not responding to any part of the question is because there are few places with circuits installed in industrial education classrooms and laboratories. The data in Table 28 indicates that only 58 percent of the colleges and universities in the study have this facility available.
The participants were questioned on the use of motion pictures in conjunction with other materials and methods. Five percent reported that this medium is used in conjunction with other materials and methods only for teaching professional sequence courses. Ten percent indicated it is used in conjunction with other materials and methods only for teaching related information subjects. Five percent of the colleges and universities reported that motion pictures are used in conjunction with other materials and methods only for teaching manipulative skills. Forty-seven percent responded that the medium is used for all of the above-mentioned purposes. Nineteen percent reported that motion pictures are used in conjunction with other media for various combinations of purposes. One percent indicated the medium is used for other purposes; 1 percent did not consider the question to be applicable to their particular situation, and 7 percent did not respond to any part of it. The data are presented in Table 31.
### TABLE 31

**MOTION PICTURES USED IN CONJUNCTION WITH OTHER MATERIALS AND METHODS**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion pictures are used in conjunction with other materials and methods only for teaching professional sequence courses</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Motion pictures are used in conjunction with other materials and methods only for teaching related information subjects</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Motion pictures are used in conjunction with other materials and methods only for teaching manipulative skills</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Motion pictures are used in conjunction with other materials and methods for all of the above purposes</td>
<td>59</td>
<td>53</td>
</tr>
<tr>
<td>Motion pictures are used in conjunction with other materials and methods for combinations of the above purposes</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>Motion pictures are used in conjunction with other materials and methods for other purposes</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No response to any part of question</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

N: 110
Table 32 presents data on the use of motion pictures of live demonstrations by faculty members made for reference.

**TABLE 32**

**MOTION PICTURES OF LIVE DEMONSTRATIONS GIVEN BY FACULTY FOR REFERENCE BY STUDENTS**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>99</td>
<td>90</td>
</tr>
<tr>
<td>Not applicable</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**N: 110**

by students. Eight percent of the institutions gave an affirmative response to a question on the subject; 90 percent responded negatively, and 3 percent indicated the question is not applicable to their particular situation. One of the respondents who replied "no" to the question indicated that his institution had used motion pictures for the purpose of recording demonstrations, but the practice was abandoned. It seems that this is an effective means of enabling students to observe as many times as necessary a demonstration which involves complex processes and concepts. The fact that it is not used by many institutions may indicate that consideration has not been given to the possible benefits of such utilization.
Data on the use of still pictures of processes and projects completed by students are presented in Table 33. Seventy-one percent of the respondents questioned on the subject indicated that still pictures are used for these purposes. Twenty-nine percent gave negative answers.

**TABLE 33**

**STILL PICTURES OF PROCESSES AND PROJECTS COMPLETED BY STUDENTS, AND USED FOR INSTRUCTIONAL PURPOSES**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>78</td>
<td>71</td>
</tr>
<tr>
<td>No</td>
<td>32</td>
<td>29</td>
</tr>
</tbody>
</table>

N: 110

Data on the question of the practice of the department giving assistance to the student teacher in the selection and preparation of instructional materials are presented in Table 34. Eighty-two percent of the institutions reported that assistance is given; 17 percent indicated that no assistance is given, and 1 percent replied that the question is not applicable to their particular situation.
### Table 34

DEPARTMENTAL ASSISTANCE TO THE STUDENT TEACHER IN THE SELECTION AND PREPARATION OF INSTRUCTIONAL MATERIALS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>90</td>
<td>82</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

N: 110

**Instruction in development and use of instructional media**

The participating colleges and universities were questioned on the requirement for pre-service teacher education students to take instructional media courses. Table 35 presents the responses. Forty-four percent of the institutions answered "yes"; 56 percent answered "no."
TABLE 35

REQUIREMENT FOR PRE-SERVICE TEACHER EDUCATION STUDENTS TO TAKE INSTRUCTIONAL MEDIA COURSES

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>48</td>
<td>44</td>
</tr>
<tr>
<td>No</td>
<td>62</td>
<td>56</td>
</tr>
</tbody>
</table>

N: 110

Table 36 presents data on the approximate percentage of industrial teacher education students who take an

TABLE 36

PERCENTAGE OF INDUSTRIAL TEACHER EDUCATION STUDENTS WHO TAKE AN INSTRUCTIONAL MEDIA COURSE AS AN ELECTIVE WHEN NO SEPARATE COURSE IS REQUIRED

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 10 percent</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>11 to 20 percent</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>21 to 30 percent</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>31 to 40 percent</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>41 to 50 percent</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>51 to 60 percent</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>61 to 70 percent</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>71 to 80 percent</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>81 to 90 percent</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>91 to 100 percent</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>No response</td>
<td>21</td>
<td>34</td>
</tr>
</tbody>
</table>

N: 62
instructional media course as an elective when no separate course is required.

The respondents were asked by what methods do teacher education students receive instruction in utilization of instructional media when no separate course is required or taken as an elective. The results are reported in Table 37.

### TABLE 37

**METHODS BY WHICH TEACHER EDUCATION STUDENTS RECEIVE INSTRUCTION IN UTILIZATION OF INSTRUCTIONAL MEDIA WHEN NO SEPARATE COURSE IS REQUIRED OR TAKEN AS AN ELECTIVE**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruction is received only through integration with methods courses ...........</td>
<td>5</td>
<td>26</td>
</tr>
<tr>
<td>Instruction is received only through professional education core ..................</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Instruction is received only with student teaching ...........</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Instruction is received through a combination of the above methods ..................</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Instruction is received through other methods ..................</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>No response to any part of the question ...........</td>
<td>9</td>
<td>47</td>
</tr>
</tbody>
</table>

N: 19
Twenty-six percent of the respondents reported that such instruction is integrated with methods courses; 11 percent indicated it is received through a combination of methods; 16 percent gave methods other than the above-mentioned, and 47 percent did not respond to the question.

The respondents were asked if consideration is given to accepted theories of teaching and learning in the selection of instructional media. The results are presented in Table 38.

**TABLE 38**

**ACCEPTED THEORIES OF TEACHING AND LEARNING IN THE SELECTION AND USE OF INSTRUCTIONAL MEDIA**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>100</td>
<td>91</td>
</tr>
<tr>
<td>No</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

N: 110

Ninety-one percent of the institutions answered affirmatively; 8 percent gave negative responses, and 1 percent did not consider the question applicable to their particular situation.
The data in response to the question "are the newer media of instruction used in conjunction with field trips?" are presented in Table 39. Sixty-four percent of the colleges and universities answered affirmatively to the question on the use of field trips in conjunction with the newer media of instruction, and 36 percent gave negative answers.

**Table 39**

**FIELD TRIPS USED IN CONJUNCTION WITH NEWER MEDIA OF INSTRUCTION**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>69</td>
<td>64</td>
</tr>
<tr>
<td>No</td>
<td>41</td>
<td>36</td>
</tr>
</tbody>
</table>

N: 110

Data on plans for use of instructional media in the teacher education program when the curriculum is developed or revised are presented in Table 40. Sixty-three percent of the institutions responded affirmatively to the question on this subject. Thirty-five percent gave negative responses, and 2 percent indicated that the question does not
TABLE 40

PLANS FOR USE OF INSTRUCTIONAL MEDIA WHEN CURRICULUM IS DEVELOPED OR REVISED

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>69</td>
<td>63</td>
</tr>
<tr>
<td>No</td>
<td>39</td>
<td>35</td>
</tr>
<tr>
<td>Not applicable</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

N: 110

The reason that 39 percent of the respondents gave negative replies may be because the question was not understood, or because no curriculum changes are planned for the near future.

The colleges and universities participating in the study were questioned on their subscriptions to periodicals in the instructional media field. It may be noted in Table 41 that 73 percent of the respondents reported that the industrial education departments at their institutions subscribe to none of the periodicals listed. Nineteen percent subscribe to some of those listed, and only 4 percent subscribe to all. Other figures are given for those subscribing to a single periodical. Many of the respondents
indicated that although the industrial education department does not subscribe to the periodicals, their audio-visual center or library does.

**TABLE 41**

**SUBSCRIPTIONS TO PERIODICALS IN THE INSTRUCTIONAL MEDIA FIELD**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department subscribes to Audio-Visual Communication Review only</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Department subscribes to Audio-Visual Instruction only</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Department subscribes to Business Screen only</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Department subscribes to Educational Screen and Audio-Visual Guide only</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Department subscribes to Film and A-V World only</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Department subscribes to Tape Recording only</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Department subscribes to Film Quarterly only</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Department subscribes to all of the above</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Department subscribes to some of the above</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>Department subscribes to none of the above</td>
<td>80</td>
<td>73</td>
</tr>
</tbody>
</table>

N: 110
Facilities for instructional media

Table 42 shows that 77 percent of the respondents gave affirmative answers to the question on a special room(s) or auditorium equipped for the showing of projected materials, and 23 percent answered negatively.

The data on acoustical treatment of a special room(s) or auditorium used for projections, as presented in Table 43 indicates that 44 percent of the respondents gave affirmative answers to the question on the subject, and 56 percent responded negatively.

<table>
<thead>
<tr>
<th>TABLE 42</th>
</tr>
</thead>
</table>

SPECIAL ROOM(S) OR AUDITORIUM IN THE DEPARTMENT EQUIPPED FOR THE SHOWING OF PROJECTED MATERIALS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>85</td>
<td>77</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>23</td>
</tr>
</tbody>
</table>

N: 110
TABLE 43

ACOUSTICAL TREATMENT OF SPECIAL ROOM(S) OR AUDITORIUM
USED FOR PROJECTIONS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>48</td>
<td>44</td>
</tr>
<tr>
<td>No</td>
<td>62</td>
<td>56</td>
</tr>
</tbody>
</table>

| N:       | 110                    |

The data with regard to the question on the ability to darken the laboratories (shops) for the use of projections are presented in Table 44. Forty-seven percent answered "no," and 11 percent indicated that some of the laboratories (shops) could be darkened. One percent indicated that the question is not applicable to their particular situation because rear screen units are now being used.
TABLE 44

DARKENING OF LABORATORIES (SHOPS)
FOR THE USE OF PROJECTIONS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>52</td>
<td>47</td>
</tr>
<tr>
<td>No</td>
<td>45</td>
<td>41</td>
</tr>
<tr>
<td>Some</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

N: 110

Data on the location of built-in display cabinets where they can be viewed by the maximum number of people is presented in Table 45. Fifty-four percent of the respondents answered "yes" to the question on the subject, and 45 percent answered "no". One percent indicated that some of the cabinets are optimally located.

As shown in Table 46, in reply to the question on a film library being located in the department, 27 percent of the respondents answered "yes", and 73 percent gave negative responses.

As shown in Table 47, eighty-six percent of the institutions studied indicated there is storage space in
TABLE 45

LOCATION OF BUILT-IN DISPLAY CABINETS WHERE THEY CAN BE VIEWED BY A MAXIMUM NUMBER OF PEOPLE

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>59</td>
<td>54</td>
</tr>
<tr>
<td>No</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>Some</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

N: 110

TABLE 46

FILM LIBRARY LOCATED IN DEPARTMENT

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>No</td>
<td>80</td>
<td>73</td>
</tr>
</tbody>
</table>

N: 110

their industrial education departments for audio-visual equipment and materials. Fourteen percent gave negative responses to the question on the subject.
TABLE 47

STORAGE SPACE IN THE DEPARTMENT FOR AUDIO-VISUAL EQUIPMENT AND MATERIALS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>95</td>
<td>86</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>14</td>
</tr>
</tbody>
</table>

N: 110

Budgetary aspects of the instructional media program

Table 48 presents data on the allotment of a specified amount of departmental funds for audio-visual equipment and materials.

TABLE 48

ALLOTMENT OF SPECIFIED AMOUNT OF DEPARTMENTAL FUNDS FOR AUDIO-VISUAL EQUIPMENT AND MATERIALS

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>No</td>
<td>85</td>
<td>77</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

N: 110
materials. Twenty-two percent of the institutions responded affirmatively to the question on the subject. Seventy-seven percent gave negative answers, and 1 percent indicated that the question is not applicable to their particular situation. The high percentage of negative answers to this question may mean that funds for the instructional media are taken from the general budget as the need arises. If this is the case, it does not seem that adequate plans can be made for the use of these media if specific funds are not allotted for them. Some of the respondents indicated that funds for instructional materials are allocated for the entire institution through the audio-visual center or the library. The method varies from institution to institution.

The data with regard to the adequacy of funds for audio-visual equipment and materials are presented in Table 49. Fifteen percent of the respondents gave affirmative answers to the question on the subject; 78 percent of the answers were negative, and 6 percent of those responding indicated that the question is not applicable to their particular situation.
The participants were questioned on the time of year instructional materials are ordered at their institutions. Seventy percent of the responses were that materials are ordered at any time during the year as they are needed. Five percent indicated that they are ordered late in the summer on the basis of compiled requests from individual faculty members. One percent reported that they are ordered ninety days prior to the time they are needed. One percent indicated they are ordered in the autumn and again in the spring. Fourteen percent of the respondents reported that instructional materials are ordered more times during the school year than one. Four percent of the institutions
reported that the materials are ordered at times other than those listed above. Six percent of the respondents failed to answer any part of the question. The data are reported in Table 50.

### TABLE 50

**TIME OF YEAR INSTRUCTIONAL MATERIALS ARE ORDERED**

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional materials are ordered at any time during the year as they are needed</td>
<td>77</td>
<td>70</td>
</tr>
<tr>
<td>Instructional materials are ordered late in the summer on the basis of compiled requests from individual faculty members</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Instructional materials are ordered ninety days prior to the time they are needed</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Instructional materials are ordered in the autumn and again in the spring</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Instructional materials are ordered at times other than those listed above</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Instructional materials are ordered at more than one of the times listed above</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>No response to any part of the question</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

N: 110
Evaluation of the instructional media program

Table 51 gives the responses to the question on current research programs relating new media utilization to the preparation of teachers. Twelve percent of the institutions gave affirmative answers; 87 percent responded negatively, and 1 percent indicated that the question is not applicable to their particular situation. It should be noted that of the 13 institutions indicating they have current research programs, more than 50 percent described the research as being in the area of programmed instruction. The projects involved a range of materials and equipment from the linear sequence booklet form to the use of a computer-assisted facility. The types of subjects included both skills and information, and such areas as wood technology and electronics.

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>No</td>
<td>96</td>
<td>87</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

N: 110
The respondents were questioned on conditions under which teacher educators make optimum use of instructional media. All parts of the question were answered by some of the respondents. Therefore, the parts in Table 52 which have no figures opposite them do not mean that no responses were made. It means that they were not given as the only condition under which teacher educators make optimum use of the media. Four percent of the respondents indicated that teacher educators make optimum use of the media to the extent that they are readily available; 1 percent indicated that teacher educators make optimum use of the media to the extent that they have had instruction in their use. Four percent indicated that optimum use is made when teacher educators understand the value of the media. Thirty percent of the respondents indicated that optimum use is made of the media when all of the stated conditions prevail. Forty-five percent indicated that optimum use is made when some of the conditions prevail. Two percent indicated that teacher educators do not make optimum use of the media under any condition. Fifteen percent of the respondents did not answer any part of the question.
TABLE 52
CONDITIONS UNDER WHICH TEACHER EDUCATORS MAKE OPTIMUM USE OF INSTRUCTIONAL MEDIA

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher educators make optimum use of instructional media to the extent that the media are readily available</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Teacher educators make optimum use of instructional media to the extent that they have had instruction in their use</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Teacher educators make optimum use of instructional media to the extent that scheduling difficulties are minimized</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>Teacher educators make optimum use of instructional media to the extent that they are aware of materials that are pertinent to their specific areas</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Teacher educators make optimum use of instructional media to the extent that they understand their value</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Teacher educators make optimum use of instructional media to the extent that other conditions prevail</td>
<td>33</td>
<td>30</td>
</tr>
<tr>
<td>Teacher educators make optimum use of instructional media to the extent that all of the above conditions prevail</td>
<td>49</td>
<td>45</td>
</tr>
<tr>
<td>Teacher educators make optimum use of instructional media to the extent that some of the above conditions prevail</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No response to any part of the question</td>
<td>17</td>
<td>15</td>
</tr>
</tbody>
</table>

N: 110
The respondents were asked for their opinions on the

TABLE 53

OPINIONS ON FUTURE USE OF THE MEDIA OF INSTRUCTION

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Institutions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of the media of instruction will likely increase in the future due to automation</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Use of the media of instruction will likely increase in the future due to larger enrollments</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Use of the media of instruction will likely increase in the future due to development of new industrial materials</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Use of the media of instruction will likely increase in the future due to a greater awareness on the part of educators of their value</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Use of the media of instruction will likely increase in the future due to other factors</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Use of the media of instruction will likely increase in the future due to all of the above</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Use of the media of instruction will likely increase in the future due to all of the above and other factors</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Use of the media of instruction will likely increase in the future due to some of the above</td>
<td>48</td>
<td>44</td>
</tr>
<tr>
<td>Use of the media of instruction will likely increase in the future due to some of the above and other factors</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>No response to any part of the question</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

N: 110
future use of the media of instruction. Data on the question are presented in Table 53. All parts were answered by one or more of the participants. Only one item was not considered as the single factor likely to bring about increased use of the media in the future. That item is the one concerning the development of new industrial materials. Only one percent thought that automation would be a factor bearing on the increased use of the media. This statement was included because it is believed that as industry becomes more automated and increases in complexity, it will become more and more difficult to duplicate industrial processes and products in a school situation. With increased use of the media of instruction it seems plausible that the problem could be reduced considerably. Three percent considered larger enrollments as the single factor.

Twelve percent of the respondents gave "greater awareness on the part of educators of their value" as the single factor likely to increase use of the media. Twenty percent thought all of the factors listed in the table may influence future use of the media. Forty-four percent thought some of the factors listed would bring about increased utilization.
Three percent indicated they thought all of the factors listed plus others would bring about increased use of instructional media. Five percent thought some of the factors and others would likely influence the media of instruction. Ten percent of the respondents failed to answer any part of the question.

Part II - Data from Interviews and Observations Obtained through Personal Visits

The interviews for this study were arranged approximately four to five weeks prior to the time they took place. A letter, explaining the purpose of the visit, a self-addressed postcard for its confirmation, and a questionnaire (the same as mailed to the 145 other institutions in the study), were sent to the five midwestern universities.

The persons interviewed were either department chairmen or their designees. Presumably, it was arranged for the writer to see the person in the department who is most familiar with instructional media. Each interviewee had been told that it would not be necessary to return the questionnaire by mail because the writer would pick it up
in person. This seems to have been a mistake because only two of the five had completed it fully when he arrived. One had answered it partially, and another completed it later and returned it by mail. The fifth questionnaire was not received. It is understood that these professors have busy schedules, and in spite of the brevity of the questionnaire, they were completed with some sacrifice of time.

Because of the way the questionnaire was designed, it was not intended to be used for interviews. Another set of questions was drawn up for this purpose, but after the first interview it was found that only three of the original six questions were suitable for all situations. The reason is that in each case the interview was begun by the interviewee giving the writer a background of the situation at his institution. This method answered many of the questions that would have been included in a structured interview. Further, the questionnaire that had been mailed to the interviewee gave some indication of the type of information being sought in the study.
At three of the universities, visits to facilities other than those in the industrial education department had been pre-arranged. The usual pattern was to have the interview, and then visit the facilities. The average time spent at each university was from two to three hours. The writer was cordially received at each institution, and all interviewees were very generous with their cooperation.

University A

At University A there is an audio-visual department for the university. There are no separate facilities in the college of education nor in the industrial education department. Films and slides may be ordered from the university center, or they may be bought by the department and equipment for their use may be obtained from the center. Some equipment is distributed to departments on a loan basis for an entire school quarter. When this is done, it is operated by the instructor. If a preview is desired, the university center sets up the equipment and materials, and the instructor goes to the center to see the projection.
There is no programmed instruction used in industrial teacher education at University A, but some industrial education students take a course in psychology, which involves the use of programmed instruction. The title of the course is "The Learning Process and Programmed Instruction." There is also a practicum in educational psychology, which involves programmed instruction and is taught by a former president of the Programmed Instruction Institute. University A also has a Department of Instructional Technology in the college of education.

Educational television is not used in industrial teacher education at present, but closed circuit television will be available in the future. Some students have participated in educational television through their student teaching experiences in the city in which University A is located.

In response to the question on instructional media courses being required, the interviewee responded negatively, but he said that such a course is a "guided elective." With regard to the use of models and mock-ups, the interviewee indicated that students working toward the
master's degree must construct a project which involves instructional materials. Such projects have included overhead transparencies for drafting, a series of slides for orientation to machines, slides with tapes entitled "Orientation to Machine Shop," and "Orientation to Industrial Arts." Another involving slides was entitled "Exploring the Building Trades." Projects have also included transparencies for teaching electronics, and transparencies used in conjunction with orthographic projection boxes.

There is an organized course in the use of field trips at University A. Its title is "Modern Industrial Processes." Ten or twelve industries are visited during a quarter. Motion pictures are used in conjunction with these trips.

A special course involving instructional media in industrial education is called "Developing Instructional Materials." Scale models of laboratories, and silhouettes of equipment are constructed in the laboratory planning course.

The interviewee indicated that he keeps abreast of new developments in the field of instructional media through professional magazines. He also reported that all faculty members in industrial education at University A use the media.
University B

The industrial education department at University B rents audio-visual equipment from the university audio-visual center. The arrangements for obtaining what is needed are made through telephone calls. The college of education has a well-equipped instructional materials center. Included among the selection of materials and equipment are publications on various topics, 8 mm films, charts, graphs, tapes, recorders, and teaching machines. A special room in the center is used for the previewing of projected materials. Models and mock-ups are located in the industrial education department.

Closed circuit television is available in all classrooms and laboratories. It has been used to give demonstrations in industrial arts subjects to as many as eighty students in a class. There are provisions for students to ask questions and get responses during a lesson. At the time this writer was at University B, he observed that a lesson in typing was being taught by television. The studio and transmission facilities for the entire campus are located in the education building.
The audio-visual center is staffed by professional personnel who prepare materials for individual instructors and departments. There are facilities for making sound recordings and producing graphic materials. The film library is located in the center. It is possible to obtain motion pictures within hours after ordering them. Those that are not available there may be obtained from another university in the state within three or four days. The audio-visual center at University B is currently housed in a temporary building. In the near future it will move to a new and permanent facility.

The industrial education department at this university has made teaching machines and has written programs for them, but the interviewee stated that he was not sure that this medium enhanced the learning process. It was the writer's impression that scant attention is being given to this medium in the department at University B.

A separate course in instructional media is not required of industrial education students. This instruction is given through the regular methods courses. The students are required to construct mock-ups and educational bulletin
boards. A machine for making paper by hand was constructed by students in the department; a demonstration of its use was given on an educational television program.

There is a photographic darkroom located in the industrial education department at University B. It may be used for instruction in photography in industrial arts education classes, and it may be used in processing photographs for use in instruction. The writer observed that special light-tight venetian blinds facilitate the projecting of materials in classrooms.

**University C**

The use of instructional materials in industrial teacher education at University C is currently quite limited. However, a major audio-visual center is being developed to serve not only the department of industrial education, but the entire college of education. This is the outgrowth of the setting up of a special office in October, 1964, to improve instruction. The unit is comprised of three divisions: Instructional Materials, Evaluation, and Instructional Television.
The present audio-visual center at University C is essentially a library of films. In addition, there is a motion picture production unit and a photographic services unit. These are administered by technicians rather than educators.

There are no courses offered in audio-visual instruction at University C. At one time there was a course entitled "Audio-Visual Instruction." It is still listed in the catalog of the university, but it is no longer offered.

At present there is more use of educational television than of any of the other media. The education building is connected with co-axial cables to the campus TV studio.

The interviewee considered overhead transparencies to be one of the best media because its function is similar to that of the chalkboard. There is a special room in the education building in which transparencies are produced. Among the media that will be used in the future are team-teaching, programmed instruction, video tapes and 8 mm single concept films.

Although programmed instruction is not being used extensively as a teaching medium at University C, considerable
research is being done in this area by the Department of Psychology and Bureau of Educational Research in the Training Research Laboratory. The teaching machine systems there are computer-based, using a modified Autotutor Mark II with an IBM 1710 Control System and an IBM 1620 computer. There were thirteen teaching machines in the laboratory being modified for use with the computers. Some unique features of this system were that the student can be evaluated as he learns, and he can choose responses to material presented to him. The program on one of the machines while the writer was there was a basic course in electronics consisting of 1500 frames, each containing an amount of material equivalent to that found on the page of a textbook.

University D

There are limited audio-visual facilities in the education building at University D. Some equipment is on indefinite loan from the audio-visual center to the building audio-visual pool. There are charts and displays in the industrial education department. A handicap to the use of instructional media at University D is the decentralized locations of the industrial education laboratories
and classrooms. The equipment which is available for the department is stored in the education building where the offices are located. This factor of inaccessibility limits the use of the media considerably.

A separate instructional media course is not required of industrial teacher education students at University D, but approximately 30 percent of these students take such a course as an elective. Programmed instruction is not used as a medium in industrial teacher education, but the study of it is included in professional courses. Closed circuit television is not used.

The university audio-visual center at University D is adequately equipped, and makes facilities easily available so that students can help themselves learn. The film librarian told the writer that their university was the first in the United States to open all facilities to students at any time. Equipment and materials are checked out in a manner similar to that of checking out books.

The center at University D is primarily a service unit. It has a full-time staff of thirty-five persons, and a part-time staff of sixteen. Included in the services rendered
are the advising of staff members in the purchasing of equipment, explaining how to present materials to a class, and operating, servicing, and demonstrating the use of equipment.

University E

University E seemed to have a very adequate program for the development and use of audio-visual materials. Equipment is distributed by floors rather than departments. Each person obtains personally whatever is needed for a particular lesson, and signs a check-out sheet so that others who use the equipment will know where a device is located when it is not in its regular storage space.

Materials such as tapes and motion pictures are acquired from the audio-visual center. Filmstrips, which do not require inspection after each use, are filed and housed departmentally. Overhead transparencies are used extensively at University E. One of the persons interviewed there predicted that in a few years this medium will replace the chalkboard entirely for the teaching of drawing.

A considerable amount of materials, primarily for the use of the university, are produced at University E.
Included among those materials are 8 mm and 16 mm motion pictures. Programmed instruction is used in a beginning electrical course, and has been used experimentally for the identification of woods in a woodworking course. In each case it was found that instruction by this medium is as effective as instruction by regular methods.

An experimental room using a multimedia system has been set up in the audio-visual center. The instructor can control lights, motion picture and slide projectors at a single source.

The film library at University E has 400 titles, and many films are rented. A catalog containing all films, filmstrips, disc recordings, tape recordings, and slides owned by the university is available to faculty members. It is updated periodically.

At present there are no charges to departments for audio-visual materials and equipment, but beginning with the 1965-66 school year there will be. Each instructor operates the equipment for projected materials, or has a student to do this. The interviewee was firm in his belief that an instructor should know how to use a projector. If he does not know how, the audio-visual center will give him instruction in its use.
Summary

In this chapter, data from questionnaires returned from 110 selected colleges and universities throughout the United States have been presented and interpreted. Included also are data obtained through personal interviews and observations at five selected midwestern universities. Chapter V will present a proposed program for the development and use of instructional media in industrial teacher education at Tuskegee Institute.
CHAPTER V

A PROPOSED PROGRAM FOR THE USE AND DEVELOPMENT OF INSTRUCTIONAL MEDIA IN INDUSTRIAL TEACHER EDUCATION AT TUSKEGEE INSTITUTE

The purposes of this study were (1) to determine the extent of usage of instructional media in industrial teacher education at selected colleges and universities throughout the United States, and (2) to project a program for the development and use of the media in industrial teacher education at Tuskegee Institute. Data on the former has been presented in Chapter IV. This chapter is concerned with the latter purpose.

The criteria for the proposed program for Tuskegee Institute were presented in Chapter III. They were obtained through validation by a jury of sixteen leaders in industrial teacher education at selected colleges and universities in midwestern, northeastern, and southern states.

With one exception, the program being projected will be presented under the same major headings as the list of standards in Chapter III. They are: (1) Organization of
the Instructional Media Program in Industrial Teacher Education, (2) Administration of the Instructional Media Program, (3) Development, Acquisition, and Use of Instructional Equipment, Materials, and Methods, (4) Instruction in the Development and Use of Instructional Media, (5) Facilities for Instructional Media, (6) Budgetary Aspects of the Instructional Media Program, and (7) Evaluation of the Instructional Media Program. The exception mentioned above is "Organization of the Instructional Media Program." In the original list of criteria this section was entitled "Background Information."

Where applicable, each criterion will be discussed in view of the needs and objectives of the industrial teacher education program at Tuskegee Institute, and a recommendation will follow. All of the criteria on the original list will not necessarily be applicable to the situation at Tuskegee Institute. Therefore, they will not all be used. No attempt is made in this study to organize a curriculum for instruction in audio-visual materials and methods.

There is no centralized audio-visual center at Tuskegee Institute. Each of nine schools has the responsibility of
administering its own program. One of these schools is the School of Mechanical Industries, under which the Division of Industrial Education is organized.

The audio-visual coordinator for the school of education is the only person at the college who has had professional preparation in the field. The facility in the school of education offers limited services, primarily advisory, to other schools. The school of education also offers two courses in audio-visual education.

Organization of the Audio-Visual Program

Criterion 1: Because of its accessibility, and industrial education audio-visual center (audio-visual sub-center) should make a significant contribution to the teaching-learning process in the department.

There is a greater tendency to use instructional media when they are easily available. At Tuskegee Institute they are not presently available to industrial teacher educators, whose primary purposes are to prepare teachers of technical subjects, and teachers of industrial arts subjects for service in secondary schools. The teaching-learning process would be enhanced considerably if the instructors could obtain equipment and materials with a minimum of difficulty.
Recommendation: It is recommended that the necessary steps be taken to organize a program for the use and development of instructional media in the Division of Industrial Education at Tuskegee Institute.

Criterion 2: The person responsible for instructional media in the department should have had formal courses and practical experience in the development and use of audio-visual materials. It is imperative that the person responsible for instructional media in industrial teacher education at Tuskegee Institute be professionally oriented in the use and development of such media. This is particularly important because many of the instructors in the department have not had audio-visual education courses, and need inservice preparation.

Recommendation: It is recommended that the Division of Industrial Education at Tuskegee Institute engage a person professionally oriented in the development and use of audio-visual methods for the purpose of organizing an instructional media program.
Criterion 3: Occasional use of audio-visual equipment and materials is not an adequate substitute for an organized program for instructional media development and use.

The instructors in industrial teacher education at Tuskegee Institute should be made aware of what media are available in their respective areas, and they should be kept informed of new developments in the audio-visual field.

Recommendation: It is recommended that teachers of industrial subjects at Tuskegee Institute be informed of the value of instructional media to the learning process, and be urged to make use of them on a regular, organized basis. This may be done through memorandums, bulletins, staff meetings, and in-service teacher education classes.

Administration of the Instructional Media Program

Criterion 1: A departmental instructional media unit should serve other departments whenever feasible.

This would be a necessity at Tuskegee Institute because of the organizational structure of which the Division of Industrial Education is a part. It would be not only necessary, but highly desirable.
Recommendation: It is recommended that the proposed instructional media center for the Division of Industrial Education at Tuskegee Institute provide services to all departments within the School of Mechanical Industries.

Criterion 2: The frequency of use of audio-visual equipment is influenced by where it is stored, and the method by which it is distributed.

The most feasible method of storage for audio-visual equipment in the Division of Industrial Education at Tuskegee Institute would be in a central location. This would be near the lecture room of a proposed industrial arts materials processing laboratory. A method of distribution should be planned to suit the convenience of individual instructors and the departmental coordinator.

Recommendation: It is recommended that audio-visual equipment for industrial teacher education at Tuskegee Institute be stored in the department, and that a method of distribution to bring about maximum utilization be employed.

Criterion 3: Instructional media should be issued by the person responsible for them.

The person responsible for instructional media in industrial teacher education should have assistants to dispense instructional materials and equipment as they are
required. The brunt of the responsibility should rest upon a single individual. At Tuskegee Institute, a departmental coordinator could delegate student assistants to perform the task of dispensing the media, but he would retain ultimate responsibility.

Recommendation: It is recommended that the person responsible for audio-visual materials and equipment in the Division of Industrial Education at Tuskegee Institute be responsible for issuing the media, but that the actual function be performed by students employed for this purpose.

Criterion 4: The original responsibility for selecting instructional media should be borne by individual instructors who use them.

Instructors in the various areas of industrial education at Tuskegee Institute should be more familiar with their needs with regard to instructional media than anyone else. If they are not aware of the media that are obtainable for their respective areas, they should seek assistance from one who has had preparation in the field of audio-visual materials. It is the responsibility of each instructor however, to make the selection of the medium he wishes to use in relation to his objectives for a particular course or lesson.
Recommendation: It is recommended that each instructor in industrial teacher education at Tuskegee Institute initiate the selection of instructional media in view of his desired objectives. The impetus for such action may come from the person responsible for instructional media in the industrial education department. He may conduct workshops and hold individual and group consultations on development and use of the media.

Criterion 5: Audio-visual materials should be planned by the individuals who use them, and prepared by the departmental sub-center.

Frequently it is possible for an instructor to both plan and prepare his own instructional materials. When this is done, there is a greater likelihood that his specific needs will be met. For such materials as slides, films, filmstrips, and transparencies, professional assistance may be required. The laboratories (shops) at Tuskegee Institute are equipped sufficiently for each instructor to plan and prepare his own models, mock-ups, exhibits, and educational bulletin boards. In some cases, assistance may be needed from other laboratories (shops) in the department.
Recommendation: It is recommended that each instructor in industrial teacher education plan, and as far as possible, prepare the materials needed for his particular area.

Criterion 6: The department should have a regular program for informing the faculty of new developments in instructional media, and for training them in their utilization.

This is a special necessity at Tuskegee Institute where there is no program currently in operation. When the faculty is kept informed of new developments in instructional media, and there are instructions given in their utilization, there is a likelihood that they will be used in the teacher education courses.

Recommendation: It is recommended that the industrial education faculty at Tuskegee Institute be informed of new developments in instructional media on a regular, organized basis. It is further recommended that the faculty be given instruction in the utilization of these media when such instruction is necessary.

Criterion 7: The teaching load should be adjusted to permit sufficient time for the person responsible for the audio-visual program to perform his duties adequately.
The person responsible for instructional media in industrial education at Tuskegee Institute may or may not have a heavy teaching load. This would be determined by his primary area. If he has a heavy load, however, this should be taken into account and adjustments should be made. On the other hand, the use of the media may not be extensive, but it is expected that when the program is put into effect, there will be considerable demand for audio-visual services.

**Recommendation:** It is recommended that the instructional media coordinator for the Division of Industrial Education have an adjusted teaching load, if necessary, so that he can perform all his duties adequately.

**Criterion 8:** The services of a clerk and/or secretary are necessary for the efficient operation of an instructional media program.

As one juror who responded to this criterion indicated, the need for the services of a clerk or secretary would be dependent upon the size of the department. The industrial education department at Tuskegee Institute is not very large (fifty students - 1964-65), but the School of Mechanical Industries, of which the Division of Industrial Education is a part, had an enrollment of 265 for the 1964-65 school
year. It is likely that a center for industrial education would serve the nine departments in the School of Mechanical Industries. Therefore, there would be need for a clerk and/or secretary.

**Recommendation:** It is recommended that a clerk and/or secretary be employed for the purpose of ordering materials, scheduling of equipment, and maintaining files on materials and equipment in the proposed instructional materials center for industrial teacher education at Tuskegee Institute.

**Development, Acquisition, and Use of Instructional Equipment, Materials and Methods**

**Criterion 1:** (a) Instructional materials should be acquired from a variety of sources.

Because of the lack of a college audio-visual program at Tuskegee Institute, the majority of materials needed for a departmental program must be developed by instructors, rented and purchased from off-campus.

**Recommendation:** It is recommended that a list of sources of instructional materials be compiled for use in the proposed instructional media program for the Division of Industrial Education at Tuskegee Institute. Further, it
is recommended that among sources used for the acquisition of materials, there should be included materials developed by instructors, rental, free loan, and commercial suppliers for purchases.

(b) Instructional materials which are needed for a unique instructional situation, should be prepared by a campus facility, if feasible.

Situations may arise in which special materials are needed for a teaching situation. If such materials are prepared by a campus facility—either by the instructor or the departmental center, it is probable that exactly what is needed will be obtained. Such materials may include models and mock-ups, slides, still pictures, motion pictures, filmstrips, and overhead transparencies. The limited facilities at Tuskegee Institute prevent the production of some of these, but others can be prepared locally with little difficulty.

**Recommendation:** It is recommended that the proposed industrial education instructional media center prepare materials for unique teaching situations whenever it is practicable.
(c) Instructional materials such as motion pictures and filmstrips should be used more often than others because of their nature and availability.

Among other materials, the proposed departmental center should acquire for permanent use motion pictures and filmstrips. These materials are produced in greater quantity than others; therefore, the selection is wider. Another reason that these and other materials should be used is because of the college's isolated location, which makes it inconvenient to visit industries and museums such as those found in large metropolitan areas.

Recommendation: It is recommended that a film library be set up in the proposed instructional media center for the Division of Industrial Education at Tuskegee Institute.

(d) Instructional materials and methods of all types should be used in industrial education.

Every type of instructional medium can be used in industrial education. However, because of the nature of the field of study, some media lend themselves to utilization more often than others. The demonstration, for instance,
has wide usage because of the preponderance of skills taught. Others, such as the dramatization, are used infrequently.

Recommendation: It is recommended that instructional materials and methods of all types be considered for usage by instructors in industrial education at Tuskegee Institute.

Criterion 2: Equipment and materials should be available for student teachers preparing for, or carrying out teaching assignments.

It would be impractical for student teachers at Tuskegee Institute to use the college equipment and materials for teaching assignments because the students are usually placed some distance away from the campus. This does not eliminate the need for the media in preparing students for assignments.

Recommendation: It is recommended that students in industrial education be given assistance in the use and development of instructional media when preparing for student teaching assignments.

Criterion 3: Equipment should be selected through a combination of methods (e.g., catalogs, committee recommendations, and demonstrations by salesmen).
Various methods of selecting equipment should be used. The method of selecting on the basis of recommendations of a selection committee and advice from the college audio-visual coordinator seems to be feasible. It is assumed that the selection committee would make use of catalogs and published guides.

**Recommendation:** It is recommended that in addition to using catalogs and published guides on equipment, audio-visual materials for the proposed instructional media center for the Division of Industrial Education should be selected on the basis of recommendations of a selection committee and advice from the college audio-visual coordinator.

**Criterion 4:** Within reasonable limits, equipment should be serviced and repaired by the person who is responsible for instructional materials.

Such tasks as servicing may be performed by student assistants, but the departmental coordinator should be certain that it is done on a regular, systematic basis. Some minor repairs may be made by student assistants, or by the coordinator. After a preliminary examination is made to
see how extensive needed repairs will be, then proper action can be taken. If major repairs are needed, then the equipment should be sent to an appropriate commercial concern immediately.

**Recommendation:** It is recommended that the instructional media coordinator for the proposed center organize a system for servicing equipment, and for having repairs taken care of when needed.

**Criterion 5:** When feasible, a sufficient quantity of equipment, such as projectors, should be kept on hand for the sole and immediate use of the department.

Due to the number of departments which the proposed center may serve, it is particularly important to have a sufficient amount of equipment on hand.

**Recommendation:** It is recommended that the proposed instructional media center for the Division of Industrial Education initially have in its inventory eight overhead projectors, eight 2 x 2 filmstrip projectors, eight 8 mm sound projectors, four 16 mm sound projectors, two opaque projectors, two tape recorders, and ten portable projection screens.
Criterion 6: Films should be selected for their appropriateness to the topic being studied at the time.

Films should not be selected at random or for entertainment. It should always be kept in mind that all media should be selected on the basis of its potentiality to increase learning.

Recommendation: It is recommended that the selection of films be closely coordinated with the course outline.

Criterion 7: Motion pictures and filmstrips should be previewed by faculty members prior to being shown to the classes.

This is mandatory for effective teaching. After a film has been received and previewed, if it is not found to be suitable for the purpose for which it was intended, it should be returned to its source without being shown to the class.

Recommendation: It is recommended that motion pictures and filmstrips be previewed by the instructor concerned prior to being shown to the class.

Criterion 8: Prior to the showing of a motion picture, the class should be told the important things to look for during the running.
There are two schools of thought on the practice of telling a class the important things to look for during the running of a motion picture. It is believed by some authorities that this is a necessary aspect of preparing the students for learning from this medium. That is, by being informed of the critical points contained in the film, the interest of the students is sharpened and they are more highly motivated. It seems that if this is not done, the interest would be merely passive.

On the other hand, there are those who believe that when the students are told the important things to look for, they tend to depend on the instructor for assistance in solving problems and forming judgments. It seems that the practice could be used as a means of teaching the students initially how to make critical decisions, and after a period of time discontinue the practice.

It should be kept in mind that in the field of industrial education, which involves the teaching of highly complex skills, there may be a need to point out some of the intricate processes that will be projected. After the procedure is utilized and evaluated, it may or may not be adopted.
When students are told the important things to look for during the running of a motion picture, they become more alert, and actively involved in the learning situation.

**Recommendation:** It is recommended that students be told the important things to look for during the running of a motion picture. This should be done particularly when complex concepts and processes are being presented. It is further recommended that the students be taught how to watch motion pictures so that they can discern for themselves what the important features of a presentation are. This medium may be utilized to develop habits of critical thinking.

**Criterion 9:** Time should usually be allowed for discussion immediately after the showing of a film or filmstrip.

In all cases when a film is shown, time should be allowed for discussion immediately after. The variables here are the length of the film or filmstrip, and the length of the class period. When a filmstrip is shown, discussion can take place during the showing unless it is accompanied by sound.
Recommendation: It is recommended that in the planning of the lesson, time should usually be allowed for discussion immediately after the showing of a film or filmstrip. Unless a filmstrip is accompanied by sound, it is recommended that discussion take place at pertinent points during the showing.

Criterion 10: Catalogs of commercially produced materials should be available for use by faculty members.

Instructors should know what materials are available, and how to obtain them. One of the quickest and easiest methods of getting information is through the use of catalogs. Not only are there catalogs of commercially produced materials available, but there are catalogs of free materials.

Recommendation: It is recommended that catalogs of commercially produced and free materials be available for use by faculty members.

Criterion 11: Motion pictures of live demonstrations given by faculty members, should be made for future reference by students.

This is a particularly desirable practice if the skill or concept to be learned is highly complicated. One of the
outstanding advantages is that the student can review the steps involved in the demonstration as many times as necessary. The 8 mm film would be suitable for this purpose, for self-instruction, and for review.

**Recommendation:** It is recommended that motion pictures of live demonstrations given by instructors be made for future reference by students. It is specifically noted that attention should be given to the 8 mm film for this purpose.

**Criterion 12:** Still pictures of processes and projects completed by students should be used for instructional purposes.

The use of still pictures is an effective means of increasing learning. When pictures are made of projects and processes completed by students, they may serve to heighten the motivation of others.

**Recommendation:** It is recommended that selected projects and processes completed by students in industrial education at Tuskegee Institute be photographed for educational purposes.
Instruction in Development and Use of Instructional Media

Criterion 1: Pre-service teacher education students should be required to take instructional media courses.

When there are course requirements in audio-visual education, the student is exposed to the principles of learning and teaching and their relationship to the media. They are also given instruction in the techniques of operating equipment, and in the development of materials. At Tuskegee Institute there is an elective introductory course offered to all students in teacher education. The percentage of industrial education students who elect the course is low.

Recommendation: It is recommended that pre-service teacher education students in industrial education at Tuskegee Institute be required to take the course entitled "Introduction to Audio-Visual Education," offered by the School of Education.

Criterion 2: Instructional media should be utilized in courses in the professional education sequence.

This seems to be one of the most important places to utilize the media. Instead of "learning about" instructional media, the students should be given an opportunity
to learn "by means of" them. If audio-visual equipment and materials are used in professional courses, it is likely that students learning through their use will use them when they begin their teaching careers.

**Recommendation:** It is recommended that audio-visual materials and equipment be utilized in the professional sequence courses offered in the Division of Education at Tuskegee Institute as a planned part of the professional sequence.

**Criterion 3:** Careful consideration should be given to accepted theories of learning and instruction in the selection and use of instructional media.

If learning theories are not considered and applied in the selection and use of instructional media, it is not likely that full benefits to the students will be derived from their utilization.

**Recommendation:** It is recommended that all instructors in industrial education at Tuskegee Institute be familiar with theories of learning and instruction, and apply these theories in selecting and using instructional media. Where necessary in-service instruction concerning this aspect of teaching and learning may be offered.
Criterion 4: If they are used correctly, audiovisual media will make field trips more meaningful.

The field trip itself is an effective means of increasing learning, but when it is used in conjunction with other media, its value as a learning method is increased considerably.

Recommendation: It is recommended that audio-visual media be used in conjunction with other media in preparation for the field trip, and for review and evaluation afterward.

Criterion 5: Plans should be made for the use of instructional media when the curriculum is developed or revised.

The industrial education program at Tuskegee Institute is currently being revised. This presents an opportune time to enrich the curriculum through the use of instructional media. These media should be considered as integral parts of the learning situation rather than as "adjuncts" to it.

Recommendation: It is recommended that special provisions be made for the inclusion of audio-visual materials, methods, and equipment as an integral part of the total learning program in industrial teacher education at Tuskegee Institute. It is further recommended that conscientious
efforts be made to keep members of the faculty abreast of new developments in the field of instructional media. This may be accomplished through staff meetings, bulletins, memo-
randums, and subscriptions to such periodicals as Audio-
visual Instruction, Audio-Visual Communication Review, and Educational Screen and Audio-Visual Guide.

Facilities for Instructional Media

Criterion 1: Facilities for instructional media should include a special room(s) or auditorium for the showing of projected materials, built-in display cabinets, and a photographic darkroom.

A special room for the showing of projected materials is necessary at Tuskegee Institute because the industrial education laboratories are inadequate for this purpose. Built-in display cabinets should be located in prominent positions where they can be viewed by a maximum number of students and instructors. These cabinets, when used for educational exhibits, may serve as a means of motivation to the students, and for in-service educational purposes for instructors. The students should be involved in the planning and development of such exhibits.
A photographic darkroom in the industrial education department at Tuskegee Institute could serve several purposes. It could be used for processing pictures for instructional purposes; it could be used for giving instruction in basic photography to pre-service teachers, and it could be used as a laboratory for industrial arts education students in a photography club.

**Recommendation:** It is recommended that the facilities for instructional media in industrial teacher education include (a) a lecture room for the showing of projected materials; (b) built-in display cabinets located in prominent positions where they can be viewed by a maximum number of students and instructors; and (c) a photographic darkroom for processing pictures for instructional purposes, for giving instruction in basic photography, and as a laboratory for an industrial arts photography club.

**Criterion 2:** Storage space for all types of instructional materials and equipment should be provided in an audio-visual sub-center.

Adequate storage space is needed for two reasons—the proper care and maintenance of equipment, and for security.
purposes. Further, it is necessary to have space for the storage of materials to be used in the instructional program.

**Recommendation:** It is recommended that adequate storage space be provided for audio-visual equipment and materials in the proposed industrial education instructional media center at Tuskegee Institute.

**Budgetary Aspects of the Instructional Media Program**

**Criterion 1:** Audio-visual equipment and materials should be financed from departmental funds.

The initial funds for audio-visual equipment and materials for the proposed instructional media center should come from a special fund. Thereafter a special amount should be allotted for the purpose in the annual budget.

**Recommendation:** It is recommended that initial funds for audio-visual equipment and materials for the proposed program be made available from a special source. It is further recommended that after the center has been equipped, and annual appropriation be specified for this purpose in the regular annual budget.
Criterion 2: The adequacy of funds for instructional media should be determined by the instructional program, the number of students enrolled, and the frequency of use of materials and equipment.

All three of these factors must be taken into account, but the ultimate criterion must be the amount of learning that is derived from the use of the media. Some of the same materials and equipment are needed for a few students as for many. With regard to frequency of use, this is largely a matter of efficiency on the part of instructors. The assumption should be that the media will be used as often as is necessary to achieve the desired educational objectives.

Recommendation: It is recommended that the amount of funds for audio-visual equipment and materials for the proposed instructional media program be based upon the nature of the educational program and the frequency of use of the media.

Criterion 3: Based on compiled requests from individual faculty members, orders for instructional materials should be placed with suppliers ninety days prior to the time they are needed.
Ninety days seems to be an adequate amount of time to order in advance. Since Tuskegee Institute is remotely located, and there is not an audio-visual center on the campus, ordering well ahead of the time materials are needed is a necessity.

**Recommendation:** It is recommended that orders for instructional materials for the proposed industrial education audio-visual center be placed with suppliers ninety days prior to the time they are needed.

**Evaluation of the Instructional Media Program**

**Criterion 1:** Research should be carried on concerning increased utilization of audio-visual media in industrial teacher education.

Research is of the utmost importance in the proposed instructional media program in industrial education at Tuskegee Institute. Of particular concern to the writer is the fact that the students in industrial teacher education score low on the National Teachers Examination, not only in relation to the national norms, but also to the local norms. It seems that effective use of the media for strengthening these students in areas in which they are
weak would help them to achieve higher scores as a result of enriched experiences. Rigorous research seems to be the only method of determining if this can be done.

All types of media would be employed in such an enrichment program. Included would be kinescopes, tapes, slides, programmed instruction, filmstrips, field trips, and printed materials.

Recommendation: It is recommended that research be initiated for the purpose of determining how instructional media can contribute to the preparation of industrial education students for the National Teachers Examination.

Various educational programs are being conducted for the unemployed, underemployed, and culturally disadvantaged persons throughout the United States. Many of those persons are in the Deep South where Tuskegee Institute, one of the institutions involved in programs designed to help them to acquire skills for socially useful occupations, is located.

Although this study is not directly concerned with such programs, there are implications for the use of instructional media in accelerating the learning of skills in
training and retraining programs. Here again it seems that research could help to provide some answers to the problems that are inherent in such monumental efforts.

The remaining criteria on the original list submitted to the experts have been covered in previous sections, or they are not pertinent to the proposed program at Tuskegee Institute. With regard to evaluation of the effectiveness of the instructional media program, this can be done only after it has been in operation for a reasonable time, and any necessary adjustments have been made.

**Summary**

This chapter has been concerned with a proposed program for the development and use of instructional media in industrial teacher education at Tuskegee Institute. A criterion was stated, and discussion pertinent to it followed. After the discussion a recommendation for the proposed program was made. The final chapter VI, will contain a summary, conclusions, and implications.
CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS
FOR FURTHER STUDY

This study has been focused on the use of instructional media in industrial teacher education. The purposes were to:

(1) determine the extent of usage of instructional media in industrial teacher education at selected colleges and universities throughout the United States, and (2) to develop criteria for the establishment of a program for the use of the media in industrial teacher education at Tuskegee Institute. From the latter, based on opinions of leaders in industrial education, pertinent literature in the field of audio-visual communication, and the needs of industrial education at Tuskegee Institute, emerged proposals for the program. The proposed program presented in Chapter V is not detailed to the extent that specific amounts of equipment, materials, and funds are determined. However, recommendations have been made for minimum amounts of certain equipment, and guidelines for materials and funds have been developed.
Review of the Study

The descriptive method

A documented survey of the literature was made to determine the bases from which the utilization of instructional media is derived, and to review the utilization at various levels, with particular emphasis on teacher education.

Normative survey and status study

Two instruments were used in the study—an opinionnaire and a questionnaire. The opinionnaire, based on authoritative literature, was mailed to a jury of twenty-five leaders in industrial education at selected colleges and universities for reactions to the stated criteria. Eighteen, 72 percent of those to whom the instrument was sent, responded. Two of the eighteen failed to respond in time for the data to be included in the study. The criteria were concerned with seven aspects of use and development of instructional media: (1) Background Information, (2) Administration of the Instructional Media Program, (3) Development, Acquisition, and Use of Instructional Equipment,

After the opinionnaires were returned and the items scored, a revised list of criteria was drawn up and used in the validation of a questionnaire. This was mailed to the industrial education department chairman, or his designee, at 150 selected teacher education institutions throughout the United States. Of the 150 questionnaires mailed, 113, or 75.3 percent were finally returned. Three of the 113 could not be used in the study for various reasons. Follow-up postcards were sent to those who had not responded approximately three weeks after the questionnaires were mailed. After the cut-off date, the data were analyzed and tabulated with interpretations.

Personal interview

Personal visits were made to five selected midwestern universities for the purpose of interviewing industrial
teacher educators with regard to the use and development of instructional media in industrial education, and to observe their facilities for the media. The data obtained through these interviews and observations have been presented in Chapter IV.

Conclusions

The following conclusions are based on the data in the study:

1. All colleges and universities included in the study use instructional media in industrial teacher education to some degree.

2. The majority of institutions in the study are served by a college or university audio-visual center rather than a separate center for industrial education.

3. The individual instructor is the key person in selecting, planning, and preparing instructional media.

4. Industrial education departments at the institutions studied do not have regular programs for informing the faculty of new developments in instructional media, and for training them in their utilization.

5. Motion pictures are used more in industrial teacher education than any other media.
6. Educational television is not used extensively in industrial teacher education.

7. Student teachers are given assistance by the industrial education department in the selection and preparation of instructional materials.

8. The majority of pre-service industrial teacher education students are not required to take instructional media courses.

9. Industrial education departments at the institutions studied have special rooms or auditoriums equipped for the showing of projected materials.

10. The majority of the colleges and universities studied do not allot a specified amount of departmental funds for audio-visual equipment and materials.

11. The amount of funds appropriated for audio-visual materials at the majority of institutions is inadequate.

12. The majority of institutions do not have current research programs relating new media utilization to the preparation of teachers.

13. More research is being done on programmed instruction than on any other media. Even this, however, seemed limited in amount and scope.
14. The industrial teacher education program at Tuskegee Institute is not preparing students as adequately as it might through a well-organized instructional media program.

15. Tuskegee Institute lags behind the majority of teacher education institutions in the development and use of instructional equipment and materials in industrial teacher education.

16. An in-service program in audio-visual materials and equipment is needed for industrial teacher educators at Tuskegee Institute.

17. A detailed plan must be drawn up before an effective, organized program can be implemented in the industrial teacher education program at Tuskegee Institute.

Recommendations for Further Study

1. It is recommended that research be conducted with regard to the extent of preparation of individual instructors in the use and development of instructional media in industrial teacher education programs.

2. It is recommended that research be conducted to determine the adequacy of instruction in audio-visual methods
and materials given to pre-service industrial education students in regular methods courses, as contrasted with the instruction being given in a separate course.

3. Research is needed to determine the types of experiences in audio-visual education that are most helpful to new industrial education teachers at the elementary and secondary levels.
Dear Professor . . .

As a teacher educator, you are aware of the emphasis within recent years on the development and use of instructional media in all areas of education. The enclosed instrument is designed to be used in establishing criteria for the use of these media in preparing teachers of industrial arts, and vocational trade and industrial education.

This opinionnaire is being sent to a jury of twenty-five leaders in the field, to obtain criterion scores for the validation of a questionnaire, which will be distributed to a number of selected teacher education institutions throughout the United States.

The information is to be used in a doctoral study being made under the direction of Dr. Robert W. Haws, Professor of Education, The Ohio State University.

Please return the opinionnaire in the enclosed envelope by February 15, 1965. Thank you in advance for your cooperation.

Yours truly,

W. Vincent Payne
OPINIONNAIRE FOR INDUSTRIAL TEACHER EDUCATORS

on

The Use of Instructional Media in the Pre-Service Preparation of Industrial Arts and Vocational Trade and Industrial Education Teachers

Name of Respondent ______________________________________________

Respondent's Institution ______________________________________

DEFINITION OF TERMS

Instructional Media: This term refers to all equipment, materials, and methods used in instruction, with the exception of printed textbooks, manuals, lesson plans, and instruction sheets. Included are audio-visual equipment and materials, demonstrations, and field trips.

Industrial Education: This is used to embrace industrial arts education, and vocational trade and industrial education.

DIRECTIONS: Please encircle the appropriate letter(s) according to your agreement or disagreement with the statement. The scale ranges as follows:

Strongly Agree – SA; Agree – A; Disagree – D; Strongly Disagree – SD

SECTION 1 - BACKGROUND INFORMATION

1. Because of its accessibility, an industrial education audio-visual center (audio-visual sub-center) should make a significant contribution to the teaching-learning process in the department. SA A D SD
2. The person responsible for instructional media in the department should have had formal courses, and practical experience, in the development and use of audio-visual materials.

3. Occasional use of audio-visual equipment and materials is not an adequate substitute for an organized program for instructional media development and use.

4. Although instructional media may be available from other sources (e.g., a college or university audio-visual center), it is necessary for the department to have a fully equipped sub-center for use in teaching, and giving instruction in use of the media.

5. The frequency of use of the instructional media is proportional to the number of students enrolled in the teacher education program.

SECTION II - ADMINISTRATION OF THE INSTRUCTIONAL MEDIA PROGRAM

1. A departmental instructional media unit should serve other departments whenever feasible.

2. The frequency of use of audio-visual equipment is influenced by where it is stored, and the method by which it is distributed.

3. Instructional media in the department should be issued by the person responsible for them.

4. The original responsibility for selecting instructional media should be borne by individual instructors who use them.

5. Audio-visual materials should be planned by the individual teacher who uses them, and prepared by the departmental sub-center.
6. The department should have a regular program for informing the faculty of new developments in instructional media, and for training them in their utilization.

7. The teaching load should be adjusted to permit sufficient time for the person responsible for the audio-visual program to perform his duties adequately.

8. The services of a clerk and/or secretary are necessary for the efficient operation of an instructional media program.

SECTION III - DEVELOPMENT, ACQUISITION, AND USE OF INSTRUCTIONAL EQUIPMENT, MATERIALS, AND METHODS

1. Instructional materials:
   a) should be acquired from a variety of sources.
   b) which are needed for a unique instructional situation, should be prepared by a campus facility, if feasible.
   c) such as motion pictures and filmstrips, are used more often than others because of their nature, and availability.
   d) and methods of all types should be used in industrial education.

2. Equipment and materials should be available for student teachers preparing for, or carrying out teaching assignments.

3. Equipment should be selected through a combination of methods (e.g. catalogs, committee recommendations, and demonstrations by salesmen).
4. Within reasonable limits, equipment should be serviced and repaired by the person who is responsible for instructional materials.

5. Equipment should be tested on a "trial" basis before being purchased.

6. When feasible, a sufficient quantity of equipment, such as projectors, should be kept on hand for the sole and immediate use of the department.

7. Films should be carefully selected for their appropriateness to the topic being studied at the time.

8. Motion pictures and filmstrips should be previewed by faculty members prior to being shown to their classes.

9. Prior to the showing of a motion picture, the class should be told the important things to look for during the running.

10. Time should be allowed for discussion immediately after the showing of a film or filmstrip.

11. Catalogs of commercially produced materials should be available for use by faculty members.

12. When feasible, television circuits should be available for use in classrooms and laboratories (shops).

13. It is desirable to have large-screen television equipment available for use.

14. Educational television, and films should be used for teaching professional courses, related information subjects, and manipulative skills.
15. Motion pictures of live demonstrations given by faculty members should be made for future reference by students.

16. Still pictures of processes, and projects completed by students, should be used for instructional purposes.

17. The teacher education department should assist in the preparation of materials for student teachers.

SECTION IV - INSTRUCTION IN DEVELOPMENT AND USE OF INSTRUCTIONAL MEDIA

1. Pre-service teacher education students should be required to take instructional media courses.

2. When there are no requirements, they should be encouraged to elect them.

3. If it is not feasible for prospective teachers to get instruction in the use of instructional media in courses, some other means should be made available.

4. These media should be utilized in courses in the professional education sequence.

5. Careful consideration should be given to accepted theories of learning and instruction in the selection and use of instructional media.

6. If they are used correctly, audio-visual media may make field trips more meaningful.

7. Plans should be made for the use of instructional media when the curriculum is developed or revised.

8. To keep abreast of new developments, the industrial education department should subscribe to several periodicals in the field of instructional media.
SECTION V - FACILITIES FOR INSTRUCTIONAL MEDIA

1. A special room(s) or auditorium should be equipped for the showing of projected materials.  SA A D SD

2. The room(s) or auditorium used for projections should be acoustically treated.  SA A D SD

3. The problem of adequately darkening the laboratory (shop) may make it unsuitable for projected materials.  SA A D SD

4. Built-in display cabinets should be located in prominent positions where they can be viewed by a maximum number of people.  SA A D SD

5. A photographic darkroom should be located in the department.  SA A D SD

6. A departmental film library increases the probability of motion pictures being used by faculty members.  SA A D SD

7. A special room for previewing projected materials should be located in the departmental audio-visual sub-center.  SA A D SD

8. Storage space for all types of instructional materials and equipment should be provided in the sub-center.  SA A D SD

SECTION VI - BUDGETARY ASPECTS OF THE INSTRUCTIONAL MEDIA PROGRAM

1. Audio-visual equipment and materials should be financed from departmental funds.  SA A D SD

2. The adequacy of funds for instructional media should be determined by the instructional program, the number of students enrolled, and the frequency of use of materials and equipment.  SA A D SD
3. Based on compiled requests from individual faculty members, orders for instructional materials should be placed with suppliers ninety days prior to the time they are needed.

SECTION VII - EVALUATION OF THE INSTRUCTIONAL MEDIA PROGRAM

1. Research should be carried on concerning increased utilization of audio-visual media in industrial teacher education.

2. Teacher educators make optimum use of the instructional media when
   a) the media are readily available.
   b) they have had instruction in their use.
   c) scheduling difficulties are minimized.
   d) they are aware of materials that are pertinent to their specific areas.
   e) they understand their value.

3. Utilization of the media of instruction is likely to increase in the future.

Would you, or a member of your staff, be willing to participate in this study further by completing a short questionnaire to be mailed at a later date? YES  NO

* * * * *
APPENDIX C

TEACHER EDUCATORS TO WHOM OPINIONNAIRES WERE SENT

Asterisk (*) indicates no response was received.

Professor Harry S. Belman
(Response from Dr. Alfred S. Drew)
Purdue University
West Lafayette, Indiana

Dr. Kenneth W. Brown
State University College
Buffalo, New York

Dr. Shriver L. Coover
California State College
California, Pennsylvania

Dr. Paul W. Devore
(Response from Professor J. Richard Pfund)
State University College
Oswego, New York

Dr. Edward T. Donnelly*
State College of Fitchburg
Fitchburg, Massachusetts

Dr. John L. Feirer
Western Michigan University
Kalamazoo, Michigan

Dr. Nelson A. Hauer
Louisiana State University
Baton Rouge, Louisiana

Dr. Luther J. Haynes*
Auburn University
Auburn, Alabama

Dr. Ivan Hostetler
North Carolina State College of the University of North Carolina
Raleigh, North Carolina
Dr. John A. Jarvis*
Stout State University
Menomonie, Wisconsin

Dr. M. Ray Karnes
(Response from Dr. Robert M. Tomlinson)
University of Illinois
Urbana, Illinois

Dr. C. Blair MacLean, Jr.*
Michigan State University
East Lansing, Michigan

Dr. Donald Maley
University of Maryland
College Park, Maryland

Dr. John Mitchell
Gorham State Teachers College
Gorham, Maine

Dr. Howard F. Nelson
University of Minnesota
Minneapolis, Minnesota

Dr. Charles W. Nichols
Kent State University
Kent, Ohio

Dr. Delmar W. Olson
(Response from Dr. Henry S. Paulin)
Kent State University
Kent, Ohio

Dr. Charles P. Scott
University of Pittsburgh
Pittsburgh, Pennsylvania

Dr. G. Harold Silvius
(Response from Dr. Charles H. Sechrest)
Wayne State University
Detroit, Michigan

Dr. H. Halleck Singer
University of Pennsylvania
Philadelphia, Pennsylvania
Dr. Raymond Van Tassel  
New York University  
New York, New York

Professor Gordon O. Voss*  
University of Minnesota, Duluth  
Duluth, Minnesota

Dr. Paul N. Wenger*  
Central Connecticut State College  
New Britain, Connecticut

Professor Ralph C. Wenrich*  
The University of Michigan  
Ann Arbor, Michigan

Professor Ralph W. Whalin  
Eastern Kentucky State College  
Richmond, Kentucky
APPENDIX D

139 West 11th Avenue
Columbus, Ohio 43201
March 10, 1965

Dear

As a teacher educator, you are aware of the emphasis within recent years on the development and use of instructional media in all areas of education. The enclosed instrument is designed to obtain data on the use of these media in preparing teachers of industrial arts, and vocational trade and industrial education.

This questionnaire is being sent to 150 selected teacher education institutions throughout the United States. It is constructed broadly to cover a variety of institutions and organizational patterns. For this reason, some of the questions may not apply to your situation. The directions indicate how to respond when this is the case. The questionnaire is also constructed so that it can be answered quickly; in most cases, a check mark is sufficient. The items have been validated by a jury of department chairmen, or their designees, at selected institutions.

The information is to be used in a doctoral study being made under the direction of Dr. Robert W. Haws, Professor of Education, The Ohio State University. The data will be treated professionally and confidentially.

Please complete the questionnaire, or designate someone to do so, and return it in the enclosed envelope by March 19, 1965. Thank you in advance for your cooperation.

Sincerely yours,

Approved by: W. Vincent Payne

Dr. Robert W. Haws
Professor of Education
APPENDIX E

QUESTIONNAIRE FOR INDUSTRIAL TEACHER EDUCATORS

on

The Use of Instructional Media in the Pre-Service Preparation
of Industrial Arts and Vocational Trade and Industrial Educa­
tion Teachers

Respondent's Institution ________________________________

DEFINITION OF TERMS

Instructional Media: In this questionnaire, this term re­fers to all equipment, materials, and methods used in in­struction, with the exception of printed textbooks, manuals, lesson plans, and instruction sheets. Included are audio­visual equipment and materials, demonstrations, and field trips.

Industrial Education: This is used to embrace industrial arts education, and vocational trade and industrial educa­tion.

DIRECTIONS: If your answer to a question is YES, please in­dicate this with a check ( ) mark; if NO, leave the space blank; and if the question does NOT APPLY to your situation, print the letters NA.

SECTION I - BACKGROUND INFORMATION

1. Do you have a college or university audio-visual center at your institution? ______

2. Do you have a separate audio-visual center (audio­visual sub-center) for:
   a) the college of education? ______
   b) the industrial education department? ______
   c) a different structural unit from the above? If yes, please specify ______

3. Has the person responsible for instructional media had formal courses and practical experience in the development and use of audio-visual materials?

4. If you do not have an organized program for instructional media development and use, do you use audio-visual equipment, materials and methods periodically?

5. Are the media which are not located in the department readily available from other sources, such as the college or university audio-visual center?

SECTION II - ADMINISTRATION OF THE INSTRUCTIONAL MEDIA PROGRAM

1. If you have a departmental unit, does it serve other departments at times?

2. Is audio visual equipment
   a) centrally stored and distributed to instructors on a per-use basis?
   b) decentralized by classrooms or laboratories (shops)?
   c) checked out to individual instructors and/or departments on a long-term basis?

   d) distributed by some other means? If yes, please specify ______________________________

3. Are instructional media issued by
   a) an instructional materials coordinator?
   b) audio-visual technicians?
   c) student assistants employed for this purpose?
   d) other personnel? If yes, please specify ______________________________

4. Is the original responsibility for selecting instructional media borne by
   a) individual instructors who use them?
b) department heads?
c) an instruction committee?
d) a departmental coordinator after consulting with a selection panel?
e) someone other than the above? If yes, please specify _______________________

5. Are audio-visual materials planned by
   a) individual instructors who use them?
   b) someone else? If yes, please specify _______________________

6. Are audio-visual materials prepared by
   a) a departmental coordinator?
   b) the college or university audio-visual center?
   c) individual instructors who use them?
   d) someone other than the above? If yes, please specify _______________________

7. Does the department have a regular program (memos, demonstrations, workshops, etc.) for informing the faculty of new developments in instructional media, and for training them in their utilization?

8. Does the person responsible for instructional media have other duties, such as
   a) administrative?
   b) instructional?
   c) counseling?
   d) other than the above? If yes, please specify _______________________

9. Do you employ a clerk and/or secretary for the departmental instructional media program?
PREPARED
BY CAMPUS
FACILITY

Motion pictures,
16 mm sound.
Kinescopes
Motion pictures,
8 mm sound
Filmstrips,sound
Filmstrips,silent
Transparencies,2x2
Transparencies
3 l/1* x h
Transparencies,
overhead
Pictures, charts,
graphs
Recordings,disc
Recordings, audio
tape
Recordings,video
tape
TV programs,open
circuit
TV program,closed
circuit
Radio programs
Programmed instruc­
tion materials
Live demonstrations
Field trips
Models and mock-ups
Displays and exhibits
Educational bulletin
boards

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SECTION III - DEVELOPMENT, ACQUISITION, AND USE
INSTRUCTIONAL EQUIPMENT, MATERIALS, AND METHODS

INSTRUCTIONAL
MEDIUM

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2. Are equipment and materials used by
   a) the departmental faculty? _________________________
   b) the faculty of other departments? _________________________
   c) student teachers preparing for, or carrying out teaching assignments? _________________________
   d) others? If yes, please specify _________________________

3. Is equipment selected through
   a) catalogs of manufacturers? _________________________
   b) published guides on equipment? _________________________
   c) recommendations of other faculty members? _________________________
   d) demonstrations by salesmen? _________________________
   e) a combination of methods? _________________________
   f) means other than the above? If yes, please specify _________________________

4. Is equipment serviced and repaired by
   a) a faculty or staff member who is a specialist in audio-visual materials? _________________________
   b) student assistants? _________________________
   c) commercial concerns? _________________________
   d) someone other than the above? If yes, please specify _________________________

5. Is equipment tested on a "trial" basis before being purchased? _________________________

6. Are the following available for the sole and immediate use of departmental faculty members:
   a) 16 mm motion picture projectors? _________________________
   b) slide projectors? _________________________
   c) filmstrip projectors? _________________________
   d) other equipment? If yes, please specify _________________________

7. Are films selected on the basis of their appropriateness to the topic being studied at the time? _________________________

8. Is it the common practice for faculty members to preview motion pictures prior to showing them to their classes? _________________________
9. Are classes told the important things to look for prior to the showing of a motion picture?

10. Is time allowed for discussion immediately after the showing of a film or filmstrip?

11. Are catalogs of the following commercially produced materials available for use by faculty members:
   a) motion pictures?
   b) filmstrips?
   c) programs for self-instructional devices?
   d) others? If yes, please specify ________

12. Are television circuits available for use in classrooms and laboratories (shops)?

13. Is large-screen television equipment available for use?

14. Is educational television used in conjunction with other materials and methods for
   a) teaching professional sequence courses?
   b) teaching related information subjects?
   c) teaching manipulative skills?
   d) other purposes? If yes, please specify ________

15. Are motion pictures used in conjunction with other materials and methods for
   a) teaching professional sequence courses?
   b) teaching related information subjects?
   c) teaching manipulative skills?
   d) other purposes? If yes, please specify ________

16. Are motion pictures of live demonstrations given by faculty members, made for future reference by students?

17. Are still pictures of processes and projects completed by students used for instructional purposes?
18. Does the department assist the student teacher in the selection and preparation of his instructional materials?

SECTION IV - INSTRUCTION IN DEVELOPMENT AND USE OF INSTRUCTIONAL MEDIA

1. Are pre-service teacher education students required to take instructional media courses?

2. If no separate course is required, approximately what percentage of all industrial teacher education students take an instructional media course as an elective?

3. If no separate course instructing teacher education students in the utilization of instructional media is required, or taken as an elective, please explain how prospective teachers receive this instruction (e.g. integrated with methods courses, in professional education core, with student teaching, etc.)

4. In what courses within the professional education sequence are instructors employing such new media as closed circuit television, videotape recordings, 8 mm and 16 mm films, and kinescopes in place of, or in conjunction with live classroom observation?

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<tr>
<th>TITLE OF COURSE</th>
<th>TRANSMISSION MEDIUM EMPLOYED</th>
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5. Is consideration given to accepted theories of learning and teaching in the selection and use of instructional media?
6. Are field trips used in conjunction with the newer media (e.g. educational television, programmed instruction, motion pictures, filmstrips, slides, etc.)?

7. Are plans being made for the use of instructional media when the curriculum is developed or revised?

8. Does the department subscribe to the following periodicals in the instructional media field:
   a) Audio-Visual Communication Review?
   b) Audio-Visual Instruction?
   c) Business Screen?
   d) Educational Screen and Audio-Visual Guide?
   e) Film and A-V World?
   f) Tape Recording?
   g) Film Quarterly?

SECTION V - FACILITIES FOR INSTRUCTIONAL MEDIA

1. Is a special room(s) or auditorium in the department equipped for the showing of projected materials?

2. Is the room(s) or auditorium used for projections acoustically treated?

3. Can the laboratory (shops) at your institution be darkened adequately for the use of projections?

4. Are built-in display cabinets located in prominent positions where they can be viewed by a maximum number of people?

5. Do you have a departmental film library?

6. Is there storage space in the department for
   a) motion picture cameras?
   b) still picture cameras?
   c) motion picture projectors?
   d) filmstrip projectors?
   e) slide projectors?
f) opaque projectors?
g) overhead projectors?
h) television receivers?
i) radios?
j) tape recorders?
k) phonograph record players?
l) self-instructional devices?
m) educational bulletin boards?
n) maps, charts, and graphs?
o) models and mock-ups?
p) photographic materials?
q) recording tape?

SECTION VI - BUDGETARY ASPECTS OF THE INSTRUCTIONAL MEDIA PROGRAM

1. Is a specified amount of your departmental fund allotted for audio-visual equipment and materials (this is above salaries for instructional personnel and administrators, laboratory equipment and supplies, and books)?

2. Is the amount appropriated adequate?

3. How are instructional materials ordered at your institution:
   a) at any time during the year as they are needed?
   b) late in the summer on the basis of compiled requests from individual faculty members?
   c) ninety days prior to the time they are needed?
   d) in the autumn, and again in the spring?
   e) at times other than those listed above. If yes, please specify __________________
SECTION VII - EVALUATION OF THE INSTRUCTIONAL MEDIA PROGRAM

1. Have you current research programs relating new media utilization to the preparation of teachers? If yes, please describe ________________________________

2. Do teacher educators make optimum use of the instructional media to the extent that:
   a) the media are readily available? __________________
   b) they have had instruction in their use? ____________
   c) scheduling difficulties are minimized? ____________
   d) they are aware of materials that are pertinent to their specific areas? ________
   e) they understand their value? ____________________
   f) other conditions prevail? If yes, please specify ______________________________________

3. Do you think use of the media of instruction will likely increase in the future due to
   a) automation? ________
   b) larger enrollments? ________
   c) development of new industrial materials? ________
   d) a greater awareness on the part of educators of their value? ________
   e) other factors? If yes, please specify ______________________________________

THANK YOU FOR YOUR COOPERATION

* * * * * * *
APPENDIX F

INSTITUTIONS TO WHICH QUESTIONNAIRES WERE SENT

Asterisk (*) indicates institutions which did not respond.

<table>
<thead>
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Richmond, Kentucky

Kentucky State College
Frankfort, Kentucky

Louisiana State University
Baton Rouge, Louisiana

Southern University and A and M College
Baton Rouge, Louisiana

Grambling College
Grambling, Louisiana

University of Southwestern Louisiana
Lafayette, Louisiana

Northwestern State College
Natchitoches, Louisiana

Gorham State Teacher College
Gorham, Maine

University of Maryland
College Park, Maryland

State College of Fitchburg
Fitchburg, Massachusetts

The University of Michigan*
Ann Arbor, Michigan

Wayne State University
Detroit, Michigan

Michigan State University
East Lansing, Michigan

Northern Michigan University
Marquette, Michigan

Eastern Michigan University
Ypsilanti, Michigan

University of Minnesota
Minneapolis, Minnesota

Moorhead State College*
Moorhead, Minnesota

St. Cloud State College
St. Cloud, Minnesota

Southeast Missouri State College*
Cape Girardeau, Missouri

University of Missouri Columbia, Missouri

Lincoln University*
Jefferson City, Missouri

Northwest Missouri State College
Maryville, Missouri

Southwest Missouri State College
Springfield, Missouri

Central Missouri State College
Warrensburg, Missouri

University of Southern Mississippi
Hattiesburg, Mississippi

Mississippi Valley State College
Itta Bena, Mississippi

Jackson State College*
Jackson, Mississippi

Alcorn A and M College
Lorman, Mississippi

Mississippi State University
State College, Mississippi

Montana State College
Bozeman, Montana
Kearney State College
Kearney, Nebraska

The University of Nebraska
Lincoln, Nebraska

Keene State College
Keene, New Hampshire

Trenton State College
Trenton, New Jersey

Newark State College
Union, New Jersey

Montclair State College
Upper Montclair, New Jersey

University of New Mexico
Albuquerque, New Mexico

Eastern New Mexico University
Portales, New Mexico

State University College
Buffalo, New York

City College of the City
University of New York*
New York, New York

New York University
New York, New York

Teachers College
Columbia University
New York, New York

State University College
Oswego; New York

Appalachian State Teachers
College*
Boone, North Carolina

Elizabeth City State
Teachers College
Elizabeth City, North
Carolina

Western Carolina College*
Cullowhee, North Carolina

The A and T College of
North Carolina
Greensboro, North Carolina

East Carolina College
Greenville, North Carolina

North Carolina State
University
Raleigh, North Carolina

University of North Dakota
Grand Forks, North Dakota

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Athens, Ohio

Bowling Green State
University
Bowling Green, Ohio

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Oxford, Ohio

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Wilberforce, Ohio

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Edmond, Oklahoma
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Walla Walla College
College Place, Washington

Fairmont State College
Fairmont, West Virginia

West Virginia State College*
Institute, West Virginia

West Virginia Institute of Technology*
Montgomery, West Virginia

West Virginia University
Morgantown, West Virginia

Stout State College
Menomonie, Wisconsin

Wisconsin State College and Institute of Technology*
Platteville, Wisconsin
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Books


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