

A STUDY OF THE AVAILABILITY, UTILIZATION AND
PROJECTED NEEDS OF AUDIO-VISUAL AIDS FOR
VOCATIONAL AGRICULTURE TEACHERS IN
THE PUBLIC SCHOOLS OF JORDAN

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DEDICATED TO MY PARENTS,
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PREFACE

A need has long existed for improving agricultural methods and practices in Jordan. The vocational agriculture program holds the position of major responsibility for preparing students and farmers for more competent roles in a modernized agricultural state. The role of audio-visual aids as valuable tools which facilitate the educational process is recognized; therefore, attempts toward improving the vocational agriculture program should consider the possibilities of making more efficient use of such teaching aids. For these reasons, this investigation was conducted and it is hoped that the findings will be useful in strengthening the vocational agriculture program in Jordan.

Sincere appreciation is expressed to Dr. Robert R. Price, Head of the Department of Agricultural Education, and my major advisor, for his encouragement, counsel, and supervision. Appreciation is also extended to Dr. J. Conner Fitzgerald, Dr. William Hull, and Dr. Loris A. Parcher, for their valuable suggestions and guidance.

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CHAPTER I

INTRODUCTION

Education in Jordan

Like many other young and newly independent countries, Jordan has a strong faith in education as a means of bringing up new generations capable of and dedicated to improving the cultural, social, political, and economic conditions in the country. The growth of Arab nationalism has been accompanied by the hope for self-determination, unity, and economic independence, as well as an awakened interest in the historical heritage and a desire to contribute to civilization again as the ancient Arabs did in the dim past. Only through education can the needed skills, techniques, values, and knowledge be promoted. Arabs have a traditional respect for learning which is derived from the teachings of the Prophet Mohammad who said, "The quest for learning is a sacred duty for every Moslim, male or female," and "Seek knowledge even in China." This reinforces the contemporary impetus given by nationalism and the modern role of education as a lever for socio-economic mobility. There is a growing demand for increased and improved educational opportunities also because of the close contact with western civilization and an increased awareness of modernization with its scientific and technological innovations.

Objectives of Education

The Ministry of Education has set forth the following objectives of education in Jordan:

- To instill devotion toward God and country.
- To promote respect for democracy.
- To develop good citizens who are sound in body, creed, mind, and character.
- To cultivate an appreciation of the arts and literature.
- To promote respect for the individual and his freedom.
- To prepare the student for life and his life's work.
- To meet local needs and educate adults.
- To promote international understanding.
- To strengthen the educational and cultural ties between Jordan and sister Arab states.¹

Educational Institutions

Two types of educational institutions exist in Jordan.² These include:

1. Public schools or government schools are financed and supervised by the Ministry of Education, Ministry of Defense, Ministry of Social Welfare, and the Department of Wakfs.
2. Private schools
 - (a) National schools financed and administered by private

¹Ministry of Education, Annual Report, (Amman, 1963), pp. 13-32.

²Ministry of Information, Jordan: The Yearbook, 1964, (Amman, 1964), pp. 180-183.

individuals or agencies.

- (b) Foreign schools financed and administered by foreign individuals or agencies.

The Ministry of Education provides for the education of 68.02 percent of the total student enrollment in Jordan. Of the remaining students, the Ministry of Defense provides for 1.06 percent, the Ministry of Social Welfare provides for 0.19 percent, the Department of Wakfs provides for 0.1 percent, UNESCO and UNRWA provide for 17.12 percent, private national agencies provide for 9.63 percent, and private foreign agencies provide for 3.88 percent.³

The Ministry of Education has the authority to establish schools and supervise all schools in the country, including private schools.

School Organization

Three cycles make up the present education ladder: (a) the elementary school - a six year cycle, (b) the preparatory school - a three year cycle, and (c) the secondary school - a three year cycle (see Figure 1). A state examination is given at the end of each cycle and successful candidates are admitted to the following cycle. Those who pass the last examination at the end of the secondary cycle qualify for admission to teacher training colleges and universities.

Depending on the size of the community, all cycles of general education might be housed in one or more buildings. Children are usually admitted to elementary classes when they are six years old; however, in urban areas their admission is sometimes delayed until

³Ministry of Education, Annual Report, (Amman, 1963), p. 10.

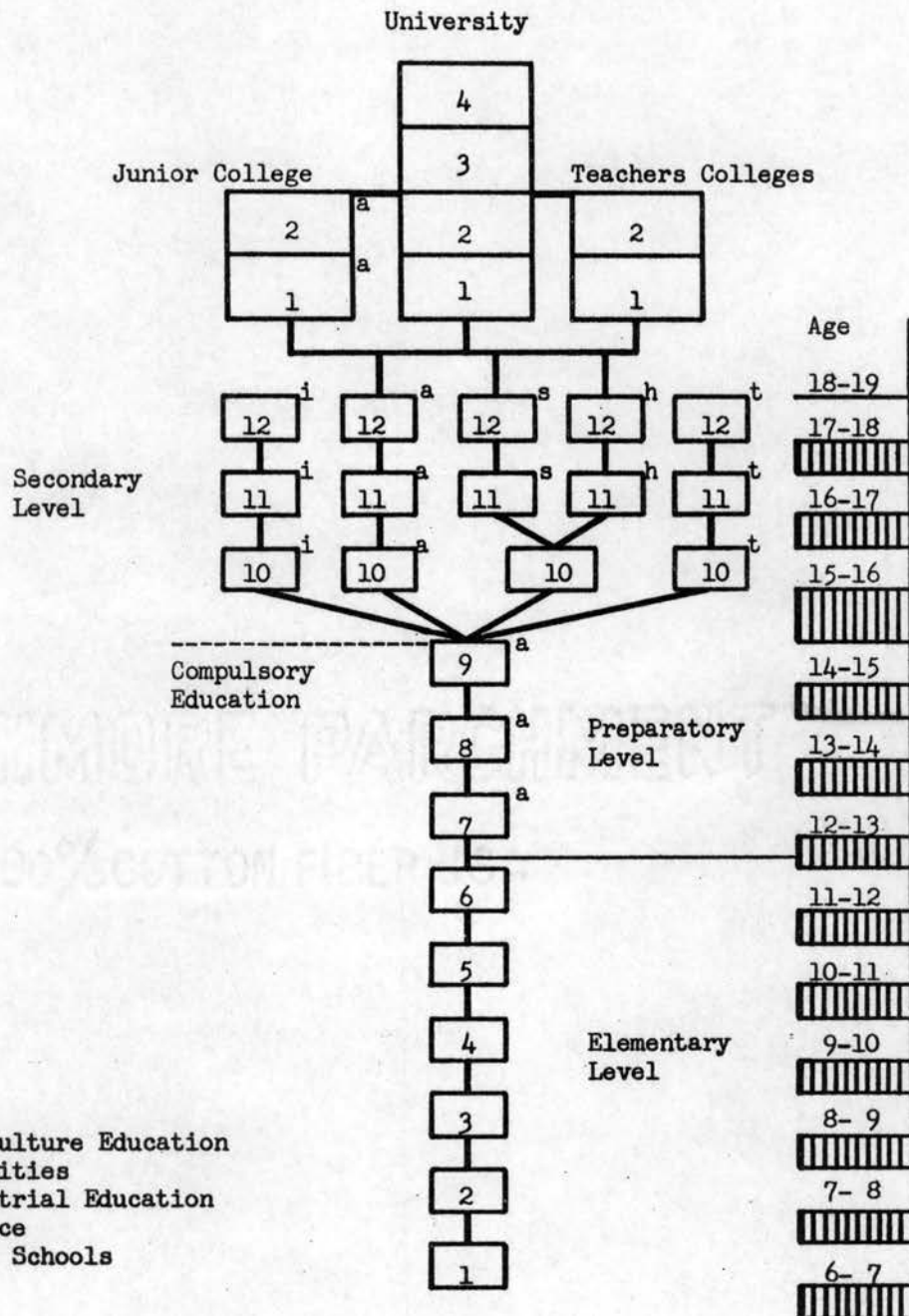


Figure 1. School Organization

they are seven because of the crowded classes and the lack of adequate facilities. Authorities are attempting to solve this problem and to make admission of all six-year-olds possible so that all grades will be homogeneous as far as age is concerned.

The Constitution provides that nine years of formal education shall be compulsory for Jordanians and shall be provided free in government schools.⁴ Students pay a nominal annual contribution for the promotion of extra-curricular activities. Vocational schools and teacher training colleges are free and provide boarding facilities.

Occasionally the public demand for education is hampered by chronic financial deficits and in some cases villagers have provided school buildings, furniture, and salaries for teachers for the first stage of a school's operation in their village. The parents actually compel the Ministry to open schools for their children.

Because of the growing needs for higher education, Jordan established its first university in 1962. Initially the university was composed of departments of Arabic, English, geography, history, archaeology, and psychology. Additional departments which are planned include: science, commercial economics, agriculture, engineering, and medicine. The University of Jordan is an independent entity governed by a board of Trustees, which is responsible for the provision of funds, the approval of the university budget, the establishment of new faculties, and the determination of university tuition.

⁴Ministry of Education, Jordan: The Yearbook, 1964, (Amman, 1964), p. 184.

Agricultural Education

Agriculture education was introduced in the country in 1930, with the establishment of Khadoori agricultural school. Students who were interested in farming were selected from the graduates of elementary schools. Priority was given to those who came from rural areas or villages. After the end of the first year, Khadoori was upgraded and entering students were selected from those who had finished the ninth grade. The two-year program offered theoretical courses and practical disciplined manual work. In 1944, Khadoori became a three year institution and the students were selected from those who had completed the first year of the secondary school (the tenth year). A fourth year for teacher preparation has since been added. Since 1950, three vocational agriculture secondary schools (Rabba, Aarub, and Shobak) have been established. The current combined enrollment of these schools is 240 students. All members of the teaching staffs of these schools, including the 15 vocational agriculture teachers, have at least a Bachelor's degree. In addition, there are 207 preparatory schools in the country which have a vocational agriculture department. Most of these schools are located in the rural areas.

In 1964, a special committee was appointed to evaluate the status of agriculture education in the country and particularly the objectives of agriculture education and the needs for meeting these objectives. The committee was composed of six representatives of the Ministry of Education, four representatives of the Ministry of Agriculture, and one representative of the American Technical Assistance Program. The committee stated that there is a need to (1) increase the per capita income

of the farmer by teaching him new methods based on research and new technology and providing for his educational needs through the vocational agriculture teachers; (2) educate students who are entering farming as a profession in improved methods based on research and technological advances; (3) upgrade the quality of vocational agriculture teachers so that they are able to work as extension specialists with adult farmers according to the needs of the community; (4) develop agricultural specialists, supervisors, and administrators to provide for leadership and teacher training and to meet the needs of the country in all phases of agriculture; (5) provide in-service training programs for vocational agriculture teachers and extension workers during the year.⁵

During the course of the study the committee made these observations: that adult farmers are bound by tradition in their farming practices; that the majority of these farmers are handicapped by their illiteracy; and that it is difficult for them to be away from their farms for a long period of time for training. That the introduction of agriculture education in the elementary and preparatory levels only promotes an interest among students in farming and that general education at these levels is more important. That the vocational agriculture training provided in the secondary schools is not adequate for the preparation of teachers; and that there is an urgent need of more teachers in vocational agriculture.⁶

⁵Ministry of Education, Special Bulletin, (Amman, 1965), pp. 3-6.

⁶Ibid.

On the basis of this study, the committee made several recommendations including the following: (1) that Khadoorie be made the center of vocational agriculture teacher training with a special joint-committee representing the Ministry of Education and the Ministry of Agriculture to be responsible for planning and executing this teacher-training program; (2) that vocational agriculture teachers should engage in research work according to the needs of their communities; (3) that the extension work with adult farmers be expanded. Audio-visual media should be used to facilitate communication with adult farmers and that demonstration should be used on the farmers' own lands rather than on experimental government farms as an effective means of teaching adult farmers; and (4) that organized tours or field-trips of groups of adult farmers to other farms allow them to see the results of various farming methods.⁷

Taking into consideration the committee's recommendations, the Ministry of Education adopted the following objectives for agriculture education:

1. To promote among the largest number of rural students an interest in farming as a profession.
2. To promote respect and pride in the farming profession.
3. To improve the social welfare of the rural areas by awakening the students' interests in their communities.
4. To acquaint students at an early age with the various vocational aspects of agriculture, industry, and commerce. (In the rural areas more emphasis is placed on agriculture.)

⁷Ministry of Education, Special Bulletin, (Amman, 1965), pp. 3-6.

5. To establish a well-equipped vocational agriculture department in every school.
6. To establish young farmer organizations in all schools.
7. To encourage individual enterprise among the student farmers by offering prizes for excellence in projects accomplished outside of school.⁸

The principal responsibility of the teacher in a democratic society is to provide his students with the information, understandings, appreciations, and values which will produce the type of behavior most beneficial to the individual within his society.

All those who are involved in the teaching profession realize that in order to fulfill this responsibility they must select the proper content of the curriculum and effectively communicate this content to the pupils.

From early times teachers have supplemented their verbal teaching with objects, pictures, and field-trips. Today there are many media utilized in communicating ideas including not only objects, pictures, and field-trips, but also chalk-boards, flannel-boards, maps, globes, charts, still pictures--both projected and non-projected, motion pictures, television, phonograph records, tape recordings and educational television programs. The various types of audio-visual materials and equipment are innumerable.

Jordanian educators have shown in the past that they recognized the importance of laboratories in the teaching of science by providing such laboratories. It is now recognized that tools of instruction are

⁸Ministry of Education, Special Bulletin, (Amman, 1965), pp. 1-2.

also vital in teaching abstract concepts and desirable attitudes. It is the responsibility of every teacher and those associated with or interested in the teaching in the Jordanian schools to develop the best possible learning environment for students not only in the field of agriculture but also in all subjects at all levels.

Statement of the Problem

This research project will be a study of the availability, utilization, and projected needs of audio-visual aids for agricultural education teachers in the Jordanian public schools, based on the needs and the goals of vocational agriculture of the country and on principles which, according to literature and research, have been found successful in this field, especially in the United States.

The study will attempt to answer the following questions:

1. At what stage of development is the present day audio-visual program for agriculture teachers in Jordan?
2. What can be done to improve this program?
3. What in-service program is needed to train the agriculture teachers of Jordan to handle such a program at its optimum effectiveness?
4. What audio-visual materials and equipment are needed for such a program?

Significance of the Study

The rate of progress in agriculture education should be accelerated at the most rapid pace possible. Although the government is emphasizing agricultural training in the country at all levels, there is still a

great need for trained teachers. With the help of administrators and supervisors, teachers strive to find more effective ways of teaching.

A great deal of research has been done on the value of audio-visual aids. The results of this research prove conclusively that they are a decided help in learning when they are chosen wisely, and used properly.⁹

The Ministry of Education has expressed a desire for a study that will show the status of the present audio-visual program and what is needed to improve this program in order to keep pace with modern educational practices.

Limitations of the Study

The normative survey section of this study was accomplished through the use of a questionnaire. The population was limited to those teachers and principals who are directly concerned with vocational agriculture in the Jordanian public schools. The section dealing with projected needs is proposed to meet the existing situation and the immediate future needs. Subsequent reappraisals and adjustments must be undertaken to maintain an effective program.

The Research Design

For the purpose of this study the normative survey method of research was employed. The most practical way to acquire information concerning the current audio-visual program in Jordan was by utilizing a questionnaire. The basis of the survey was an analysis of the audio-visual program in regard to the availability of equipment and materials,

⁹Barton Morgan, et al., Methods in Adult Education, 2nd ed., (Danville, Illinois, 1963), p. 143.

experience, utilization, and needs. The three forms of questionnaire were sent directly to the Ministry of Education which distributed them to all teachers and principals who are directly involved in vocational agriculture in the public schools. The questionnaire was written in Arabic, the native language of the respondents. The data were summarized and tabulated by the Data Processing Center of Oklahoma State University.

Definitions of Terms

It is necessary to define some of the terms used in this study:

Agricultural Education: For the purpose of this study, the term connotes Vocational Agriculture Education. This type of education is designed to develop skills, abilities, understandings, attitudes, work habits, and appreciations, encompassing knowledge and information needed by the students who are interested in the field of agriculture to enter and make progress in their farming practices on a useful and productive basis. It is an integral part of the total education program and contributes toward the development of good citizens by developing their physical, social, civic, cultural, and economic competencies.

Audio-Visual Program: In this study the term refers to an organized effort to use audio-visual materials, equipment, and techniques in schools of various levels including junior colleges and, through instruction and research, to increase the effective use and production of audio-visual materials for educational purposes on all levels.

Audio-Visual Materials: This term refers to those materials which supplement teaching by providing education through sense-perception. In this study such materials include 16 mm sound and silent motion pictures,

filmstrips, slides, transparencies, disc and magnetic recordings, exhibits, charts, posters, maps, models, mock-ups, photographs, specimens, facsimiles, mounted pictorial materials.

Audio-Visual Equipment: This term includes the apparatus or mechanical devices used to produce, present or project audio-visual materials such as projectors, still and motion picture cameras, enlargers, record and transcription players, disc and magnetic recorders, stereoscopes, radios, television receivers, graphic arts equipment, and duplicating machines.

Audio-Visual Director: This term refers to the individual who directs the program of audio-visual activities; this term may differ in terminology.

Audio-Visual Coordinator: This term refers to the individual who carries out the audio-visual program in a given school. This title may differ in terminology.

CHAPTER II

REVIEW OF RELATED LITERATURE

In newly developing countries the pressures on education stem from the aspirations of the leaders and the people who are impatient with the slow pace of educational systems which are modeled on patterns that were founded during the last fifty years in the more advanced countries. The difficulties of training enough teachers to meet the demands of education through traditional methods are overwhelming. For this reason, new teaching methods must be introduced in these countries. Television, teaching machines, and other modern devices combined with new teaching methods may provide an answer to the problems that hinder rapid progress. In these countries, according to Harbison, such innovations may be more needed than in the more advanced countries.¹

This view applies in Jordan, as seen in an article published in 1956, in which A. H. Yasin, a former principal of Teachers College in Amman, discussed the teacher training situation. He stressed the fact that more facilities for teacher training are badly needed. For example, he pointed out that in the three years prior to 1956 the Government appointed 600 new teachers. Of these only six to twelve per cent had had professional training. The need for teachers will continue to

¹F. G. Harbison, "New Nations Need New Instructional Methods," AV Communication Review, Vol. 10, No. 2, April, 1962, p. 118.

increase and the in-service training that has been provided is not enough to raise the professional status of the teachers. Yasin concluded that provisions for teacher training must be expanded four-fold over the existing facilities available in 1956.²

Very little research and literature exist which deal with audio-visual aids in Jordan. Therefore, the related literature and research dealing with audio-visual aids as they apply to educational practices in the United States will be discussed under the following categories: 1) Requirements for Audio-Visual Personnel, 2) Physical Facilities for Audio-Visual Aids, 3) Budgeting, 4) Equipment, 5) Production, and 6) Utilization.

Requirements for Audio-Visual Personnel

Brown and Norberg point out that the general qualifications of an audio-visual director include his personality characteristics, interests, education, and experience. He must have a broad understanding of education, with teacher certification and experience recommended. He must have experience in administration and sufficient understanding of research techniques to carry out advanced studies in the areas of administration and supervision of audio-visual media. The director needs "a broad liberal education, a mature philosophy of education, a general knowledge of the structure and relations of curriculum development and content at appropriate levels, and a familiarity with" the theories and practices of educational psychology. In addition, he must be thoroughly

²A. H. Yasin, "Teacher Training in Jordan," News Bulletin, Institute of International Education, May, 1956, pp. 44-46.

familiar with "the full range of educational media, equipment, . . . and skills in production processes and techniques . . ." ³

The Oregon Audio-Visual Association developed the following list of duties for directors of instructional materials centers. The duties are classified according to administrative, supervisory, advisory, and technical.

Administrative

1. Organize and maintain a central "Instructional Materials Center," serving all the schools within the district.
2. Supervise the organization and operation of the materials program within the separate schools.
3. Administer this program, with the assistance of the coordinators.
4. Determine the equipment and materials needs of the schools and determine what it will cost to fill these needs.
5. Keep reports and records of materials, equipment, and their use.
6. Select and purchase new equipment, with teacher and technical assistance.
7. Organize and administer an efficient circulation service.
8. Promote public relations leading to an understanding of and support of the program.
9. Make reports to the school administration concerning the operation and the needs of the program.

Supervisory

1. Supervise, through the coordinators, the operation of the program in the individual school.
2. Plan and carry on an in-service teacher training program through:
 - a) Conferences

³James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), p. 18.

- b) Staff meetings
 - c) Noncredit classes and training sessions
 - d) Extension (credit) classes
 - e) Demonstrations, previews, auditions
 - f) Inter- and intra-school visitations
3. Confer with teachers regarding utilization of materials.
 4. Visit classrooms.
 5. Issue bulletins giving information on availability and use of materials and equipment.
 6. Organize and make available a handbook giving information on the "Community Resources" available for educational use.
 7. Train teachers to produce certain teaching aids.

Advisory

1. Confer with administrators in the planning of new buildings and the remodeling of old structures.
2. Assist in curriculum planning.
3. Advise administrators, supervisors, and curriculum specialists in the selection and use of equipment and materials for their work.

Technical

1. Organize and maintain a library of materials (books, records, pictures, motion pictures, filmstrips, slides, exhibit materials, etc.).
2. Repair and maintain equipment and materials.
3. Produce or supervise production of certain materials (slides, exhibits, recordings, photographs, motion pictures, radio programs, etc.).
4. Train teachers and students in the operation of equipment.⁴

Audio-visual specialists perform various types of functions. These may include, according to Brown and Norberg, organizing and supervising the selection, acquisition, distribution, and inventory of equipment and

⁴Oregon Audio-Visual Association, quoted in Carlton W. H. Erickson, Administering Audio-Visual Services (New York, 1959), pp. 14-16.

materials; encouraging teachers to make wider and better use of materials; supervising the installation of equipment; facilitating the use of media by establishing a better physical environment; producing certain graphic materials, such as transparencies, slides, handbooks, charts, etc.; carrying out research and evaluation; and supervising the use of television and radio and producing programs for these media.⁵

Basically the coordinator is an instructional materials specialist with an understanding of the curriculum, learning theory, and a knowledge of the philosophical and psychological bases underlying the use of audio-visual media.⁶

Edgar Dale lists the following as the functions of the audio-visual coordinator:

1. Surveys materials, equipment, and available personnel, and analyses them in relation to the over-all program.
2. Works with central administrative staff to improve the quality of students' experiences.
3. Helps in organizing procedures for selecting materials and equipment.
4. Informs teachers of available materials and their conditions of use.
5. Arranges production facilities for teachers and develops specialized materials and programs when needed.
6. Provides help and guidance to teachers on problems related to materials.
7. Develops long-range plans.

⁵James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), p. 19.

⁶Edgar Dale, Audio-Visual Methods in Teaching, Rev. Ed. (New York, 1954), p. 515.

8. Interprets the program to administrators, teachers, supervisors, and the public.
9. Evaluates the program in cooperation with others.⁷

Physical Facilities

School administrators know that the designs for new schools or for the renovation of existing schools must provide for the future as well as for the present needs.⁸ Today, in addition to the "typical" classroom which will accommodate what is believed to be the optimum size class (not more than 25 or 30 students), other especially equipped rooms are needed to serve as laboratories, "large-group instruction rooms," language laboratories, and rooms to facilitate the development of special skills, such as typing rooms and workshops.⁹

With the introduction and increasing use of audio-visual media have come new problems to be met by school planners. If such tools as teaching machines, projectors, television, language laboratories, tape recorders, etc., are to be used in an effective way, such things as ventilation, acoustics, and control of heat and light must be considered in light of the changing needs.¹⁰

Schuller says that, while much attention has been given to equipping auditoriums and other areas which serve as meeting places for large

⁷Ibid., p. 519.

⁸The Audio-Visual Program, Indiana Department of Public Instruction, Bulletin No. 218, (1956), p. 72.

⁹A. J. Foy Cross, et al., quoted in A. J. Foy Cross and Irene F. Cypher, Audio-Visual Education (New York, 1961), p. 310.

¹⁰Robert E. DeKieffer, Audiovisual Instruction (New York, 1965), p. 67.

groups for the use of audio-visual materials, it is increasingly important that the classroom, where most learning experiences occur, be designed and equipped to facilitate the use of these materials.¹¹

Brown and Norberg stated the following general requirements for physical facilities:

Controlling and varying light, both artificial and natural, in the teaching-learning area.

Providing electrical power in sufficient amperage and voltage with convenience and safety.

Controlling sound to eliminate reverberation and unwanted sound transmission between teaching-learning areas, and to "liven" and "deaden" (damp) room areas as required.

Providing screens on which to reflect projected still and motion-picture images.

Ventilating and heating to provide clean air at controlled temperatures and circulation sufficient to maintain a healthful, invigorating atmosphere for teaching and learning.

Seating to provide comfort, convenience, and physical well-being in all the various instructional modes and locations.

Displaying instructional materials and products throughout the period of instruction.

Storing physical equipment, student products, supplies, and other items needed by students and teachers.¹²

Controlling Natural Light

The problem of controlling natural light must be overcome if good projection conditions are to be provided. Even small holes or slits which allow light to enter the room cause distracting bright spots

¹¹Charles F. Schuller, The School Administrator and His Audio-Visual Program (Washington, D. C., 1954), p. 61.

¹²James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), p. 58.

in the room. In such circumstances the screen images may be "washed out." Various measures which may be used to combat the problem of controlling natural light include:

Drapes. Track-mounted transverse drapes completely covering window areas and made of opaque, fire-resistant materials. . .

Full-closure venetian blinds. When combined with top light seals and border strips, blinds of this type provide satisfactory natural-light control without restricting window ventilation. . .

Roller blinds. Probably the least satisfactory method of controlling natural light is to use cloth roller blinds or shades (often black on one or both sides). . .

Underground or windowless classrooms. . . total elimination of windows. . . has produced interesting results. (1) elimination of outside noise and sight distractions; (2) freedom from glare and need to adjust window curtains or blinds to outside lighting conditions; (3) consistent efficient air-conditioning; (4) possible use of every room as an audio-visual room; and (5) extra display or storage space on wall areas usually occupied by windows.

The following additional specifications pertaining to classroom construction relate to the control of natural light:

Windows should be placed only on one wall.

Heating and ventilating units should not interfere with the free opening and closing of drapes, blinds, or other darkening equipment.

Skylights or clerestory and construction (as over doors) should not be used.

Windows should open only toward the outside (not into the classroom) to avoid entangling blinds or drapes.¹³

Controlling Artificial Light

The need for adjustable artificial lighting is created because of

¹³James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), pp. 60-61.

the various ways in which projection equipment may be used. If students are to take notes during projection, there must be a brightness of at least 1 foot-candle as compared to the minimum of 1/10 foot-candle needed ordinarily for projection or to the 30 foot-candle requirement for normal classroom activities.

In order to obtain variable levels of brightness in the classroom, several methods may be used. These include dimmer switches and parallel light circuits. The best location of the dimmer switches is in the rear of the room near the projector position. With more than one lighting circuit, the level and placement of light can be varied. For example, the classroom may be darkened with the exception of the front of the room which may be illuminated with a bank of spot-lights. Various other combinations are possible which enhance the learning situation.¹⁴

Wiring

When the plans are being drawn up for a new school or for the renovation of an old school, provision should be made for an adequate number of outlets and switches for electricity and sound power supply. The necessary electric outlets, microphone outlets, speaker outlets, television and radio outlets, telephone lines, central sound systems, and light control wiring should all be considered. In order to use educational radio and television at the current time and in the future, special conduits and conductors should be installed.¹⁵

¹⁴James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), p. 62.

¹⁵A. J. Foy Cross and Irene F. Cypher, "Provision of Audio-Visual Materials, Equipment, and Building Facilities," The School Administrator

Sound Control

As the use of audio materials and devices increases, more attention must be given to reducing echo and the transmission of sound through open windows, down halls, through walls, and through air ducts.

Planners, in order to minimize sound problems, should consider these suggestions:

Before developing plans or letting bids for new construction, recommend architectural and acoustical engineering consultation with regard to wall and ceiling treatments, baffling, floor covering, partition and joist arrangements, and other crucial details.

Consider installing drapes and/or rugs in either new or old construction to reduce reverberation or echo. Acoustical panels may also be installed for this purpose, but it is usually less expensive in the long run to consult qualified acoustical engineers about such improvements than to resort to trial-and-error methods to correct mistakes.

Classroom sounds transmit readily through open-pipe heating systems. Hot-water or electrical systems largely eliminate this problem.

The shape of the room affects its sound and reverberation characteristics. Nonparallel walls produce a better sound environment than the parallel walls of square or rectangular rooms.

Improve a room's sound characteristics by hard-surfacing center ceiling portions (with smooth, hard plaster) and treating outer ceiling segments with acoustic tile.¹⁶

Ventilation

The location of ventilating ducts should not interfere with

and His Audio-Visual Program, ed. Charles F. Schuller (Washington, D. C., 1954), p. 64.

¹⁶ James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), p. 63.

bulletin board or chalkboard areas. The ventilation system should operate quietly and perform adequately during projection when drapes or other light control devices are closed. Current standards recommend an air exchange rate of 15 cubic feet of air per minute per pupil, with proper room temperatures (from 68 to 70 degrees Fahrenheit¹⁷) and humidity being constantly maintained. If the ventilation system depends on circulation through open windows, the drapes, if used, should be hung about 18 inches from the window to allow some air to enter.¹⁸

Projection Screens

Cross and Cypher offer the following guide-lines concerning projection screens: 1) the lower edge of the extended screen should be at the eye level of the seated pupils; 2) the position of the screen should make it possible to darken the surface regardless of the light conditions outside; 3) it should be placed so that it is clearly visible to all of the seated pupils. This provision will be met, if no row is wider than its distance from the screen. 4) the distance from the screen should not exceed five or six times the width of the image nor be closer than two times the width of the image; 5) a 70 by 70 inch screen will, at the present time, provide an adequate surface for all projection needs. This size screen will be filled by the image projected by the 2-inch lens of a 16 mm motion picture projector or by the 5-inch lens of a 35 mm filmstrip projector from a distance of 30 feet;

¹⁷James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), p. 66.

¹⁸Carlton W. H. Erickson, Administering Audio-Visual Services (New York, 1959), pp. 252-53.

6) because the various shapes of materials used with opaque and overhead projectors and microprojectors frequently "spill over" the top and bottom edges of a rectangular screen, square screens are recommended.

Screen Types

Matte screens . . . for square classrooms . . . the image can be seen clearly and without distortion from all parts of the classroom seating area. The reflected light is distributed more uniformly from a matte-white screen than from a beaded screen.

Beaded screens . . . Because of the greater reflective power of the beaded screens, a brighter image is obtained than on a matte screen for persons seated not more than 22 degrees from the center of the screen. However, the picture brightness tends to fall off rapidly as the viewer moves out from the center of the screen, so that at angles beyond 22 degrees the image on a beaded screen is less bright than on a matte screen. . . .

Aluminized plastic screens present a higher reflection factor than beaded screens and in general have the same limitation of viewing angles as the beaded screen.

Wide-angle screens are at present adaptable only to wide-angle motion picture projectors and films. Such material and equipment is not now readily available in schools.

"Daylight" screens . . . This group includes the hooded screen or shadow-box type, the rear-projection screen, and screens using various improved surface materials of glass, silver, plastic over aluminum, and other materials.¹⁹

Storage

An adequate amount of convenient and flexible storage space is needed to meet the changing needs of educational media and equipment. Brown and Norberg make the following suggestions concerning storage.

- 1) Storage facilities should be located throughout the

¹⁹A. J. Foy Cross and Irene F. Cypher, Audio-Visual Education (New York, 1961), pp. 326-29.

classroom depending on where the equipment, supplies, and materials are used.

- 2) Ascertain which equipment and materials need locked storage and which do not.
- 3) Provide closed cabinets or drawers in which to store frequently used materials. Open shelves may be used if the items do not need closed protection and if they may be stored neatly on such shelves.
- 4) Adjustable shelves or add-on stacking units provide needed flexibility for future use.
- 5) Glass-contained or volatile liquids should be stored in places that will insure against the dangers of fire.
- 6) The use of carts or wheeled projection stands can eliminate the need to lift heavy equipment on and off shelves if "walk-in" or "wheel-in" space is provided.
- 7) Wheeled storage units and demonstration tables can be used to give flexibility to the classroom. Such units can be moved so as to divide the room into small areas for discussion or work.²⁰

Budgeting

Planning a budget should follow a certain procedure. First, a survey must be made to clarify the task; the tools and services that will be needed must be determined; the available resources must be

²⁰James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), pp. 67-68.

ascertained; and a decision must be made on which additional resources will be acquired in consideration of the relative effectiveness and the possibility of acquiring them. Brown and Norberg identify three levels of planning based on whether the budget is planned to meet current or future needs.

The first level, "continuity budgeting," provides for the maintenance of the existing program, with provision for increased enrollment. This type of budget may be adequate, but planners must be alert to changing needs. The second level, "incremental budgeting," provides for supplementing an existing program. This type of budgeting depends on the attitudes and financial circumstances of the situation. The third level, "expansion or creative budgeting," is involved in the formation of new programs or in programs undergoing reorganization, perhaps as a result of technological advances. Level three budgeting is concerned primarily with "questions of analysis, evaluation, and judgment," and only secondarily with financial questions.²¹

A study carried out in Hawaii by William H. Durr outlined the steps for arriving at the actual costs of implementing the audio-visual program in a school whose objectives, standards, and present resources are known. Durr's procedure included the following steps:

1. Evaluate the present status.
2. Estimate the annual cost of maintaining the program at the present level.
3. Estimate the replacement items needed and their annual cost.

²¹James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), pp. 144-48.

4. Set up a five-year budgetary program needed to reach the established standard.²²

The Audio-Visual Council on Public Information in a study of successful audio-visual programs in the United States concentrated on the audio-visual budget. The findings showed that the audio-visual budget is:

1. Planned cooperatively as a part of the total school system budget based on the needs of the total instructional program;
2. Financed principally from tax funds;
3. Financed, for the most part, by regularly allocated funds, but occasionally supplemented by funds allocated to the school system budget;
4. Supplemented by bond funds for purchase of audio-visual equipment in new classroom buildings and new audio-visual centers;
5. Sometimes given financial support from the state;
6. Justified to the extent that it serves as a means for the improvement of instruction;
7. Enhanced through audio-visual demonstrations to school boards and lay groups.²³

De Kieffer reports that studies show that "schools were spending from \$0.32 to \$2.20 per pupil . ." in their audio-visual programs.²⁴

This may be compared to the recommended annual expenditure of from \$2.00 to \$6.00 per student by the Department of Audio-Visual Instruction of the National Education Association. This amount would average

²²"Hawaii's Public School Audio-Visual Program," quoted in James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), pp. 151-156.

²³Robert E. De Kieffer, Audio-Visual Instruction (New York, 1965) p. 108.

²⁴Ibid., p. 107.

about "one per cent of the annual instructional budget," according to Brown and Norberg, who explain that "the one per cent recommendation pertains to the conventional audio-visual program and is not intended to cover such media services as television, language laboratories, programmed instruction, etc."²⁵

Equipment

All types of audio-visual equipment can be evaluated according to several general criteria including: usefulness - the purchase of the item should be justified by the frequency of use; operability - the item should be simple to operate, foolproof, dependable, and accompanied by clear instructions; performance - the item should be efficient, versatile, durable, and quiet in operation; safety - the item should be designed for maximum safety; compatibility - the item should fit in with others already on hand; sturdiness - the item should be well built, of strong materials with durable fittings; repairability - it should be possible to have the item serviced and repaired locally, without undue expense for transportation; portability - if the item will be moved frequently, it should be light weight and as compact as possible; reputation - the item should be of a reliable name and purchased from a reputable dealer; cost - the cost of the item should be in line with similar items produced by other companies or, if higher, should be justified by higher quality or versatility; warranty - the item, including parts, should be covered by a reasonable guarantee; service -

²⁵James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), pp. 150-51.

Production

Local preparation of audio-visual materials has several potential values for teachers and students. In planning or creating a teaching device, one must evaluate the content of his presentation and become more critical of his approach to the communication problem. He also profits from viewing the subject from a new point of view. The students profit by gaining the benefits of materials that are not commercially available.²⁹

The importance of locally produced materials is emphasized by Chandler and Cypher:

Many of the most valuable and effective teaching aids are those which have been made either by the teachers themselves, by the students, or by teachers and students working together after formal classroom time.³⁰

In a study of practices throughout the United States, Faris, Moldstad, and Frye found that, with respect to local preparation of materials:

In individual schools, the six most frequently produced items were (in this order) graphic materials (charts, posters, etc.), large transparencies (7 by 7 inches and 10 by 10 inches), 2- by 2-inch slides, mounted pictures, photographs, and flannel boards.

In educational television stations, the rank order for the top seven items was graphic materials, photographs, mounted pictures, models, exhibits-dioramas-murals, 2- by 2-inch slides, and large transparencies.

In school systems, the rank order for the top six items was 2- by 2-inch slides, photographs, mounted pictures, graphic

²⁹ James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), p. 120.

³⁰ Anna Curtis Chandler and I. F. Cypher, Audio-Visual Techniques for Enrichment of the Curriculum (New York, 1948), p. 97.

materials, large transparencies, and flannel boards.³¹

Each school needs facilities and materials in order to prepare simple, inexpensive, and most needed materials. The types of preparation activities include:

Those undertaken by students themselves as vehicles for significant learning experiences in classrooms or shops or as photographic, artistic, dramatic, audio-visual, or library club activities, and the like

Those undertaken by teachers in individual classrooms, in special preparation rooms, or in workshops to provide instructional materials urgently and immediately needed for use in their own classes, for hallway displays, or similar purposes

Those undertaken by educational media center personnel for production within the school building or elsewhere (the district or county media center or through contracts with photo shops, commercial artists, or other outside agencies)³²

In an individual school with from 200 to 400 students a room to be used for producing materials should be available for use by teachers and pupils. This room should be equipped with the following types of supplies, facilities, and services:

Duplicating equipment and supplies, drawing tables, a light table for inspection and producing transparencies, diazo devices for producing paper or transparent productions of typed, printed or line-drawn materials.

Recording facilities such as soundproofed rooms in which teachers and students may record, duplicate, or edit tapes or record disks.

³¹James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), pp. 121-22.

³²Ibid., p. 123.

One or more large work table area with paper punching equipment, paper cutting equipment, and a dry mounting press capable of accepting 16 x 20 inch mounts, and a tacking iron.

One or more 35 mm camera, press camera, and motion picture camera; a copy stand with appropriate copying lights and controls; a photographic darkroom with adequate facilities such as an enlarger, contact printers, timing devices, developing tanks and trays.

Materials and supplies such as precut letters, lettering pens and inks, crayons, mounting board, tagboard, pressed board, tapes, film, dry-mount tissue, sheets and supplies for thermo or diazo reproductions, and carbons.³³

Utilization

The success of an audio-visual program depends on many factors. Primary among these is the ability of teachers to use audio-visual materials. The following criteria for evaluating teacher competency in using audio-visual materials have been suggested by a committee for the Indiana Department of Public Instruction:³⁴

1. Teachers should be able to use audio-visual materials under favorable physical conditions.
2. Generally only one teacher and his class should use a specific unit of materials at one time.

³³James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), pp. 123-24.

³⁴The Audio-Visual Program, State of Indiana, Department of Public Instruction (Indianapolis, 1956), p. 122.

3. Auditorium, assembly, and other large group use of appropriate films and other audio-visual materials should be encouraged.
4. Teachers teaching the same subject matter in the same grades generally will find it possible to use materials during the same booking period.
5. Teachers teaching the same content in different subjects or on different grade levels generally will not be able to use materials during the same booking period.
6. An administrative organization should be so organized that a teacher can have audio-visual materials and equipment at the time most appropriate to the lesson sequence and with a minimum amount of effort.
7. Each school should have someone available to teach equipment operation to teachers and pupils and advise how to set up the equipment and arrange seats for the best use of materials.
8. Some type of student help, as projectionist clubs or assigned pupil assistants, should be used to operate most equipment. Teachers should have an opportunity to learn projection and equipment operation if they choose to do so.³⁵

According to Brown and Norberg, teachers need the following competencies in order to use educational media effectively:

- (1) understanding of the behavioral processes involved in communication and learning, (2) knowledge of media characteristics and capacities, (3) ability to evaluate and conduct or participate in experimental studies of teaching and learning, (4) familiarity with appropriate materials and their sources, and (5) command of necessary mechanical skills.³⁶

The results of a 1963 nationwide survey conducted by the NEA indicated that many classroom teachers believed that their preparation had been inadequate as far as audio-visual materials and equipment

³⁵ Ibid., pp. 122-23.

³⁶ James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), p. 162.

were concerned.³⁷ Although it is becoming more common for states and universities to require an audio-visual course for certification, the rising subject matter requirements are leaving less space in the university curriculum for special audio-visual courses. Therefore, the need for in-service programs is a real one. In-service training can help experienced teachers improve their teaching practices by showing them how to use audio-visual media.³⁸

In-service programs can be most effective, according to Flanders, when they follow these guidelines:

Proposed ideas about teaching and learning must be organized into concepts which have meaning in terms of overt behavior.

Concepts about teaching and learning become useful to the extent that they can be applied personally - related to the teacher's own behavior, his own pupils, his own classroom.

Insight into principles of effective teaching comes about through personal inquiry.

Teachers should have opportunities to practice or try out techniques or procedures during the in-service program.

Emphasis should be placed on resources that enable teachers to implement the trial of new concepts and methods.

Teacher participation in the in-service program should be voluntary.

Teachers should have ample opportunity to evaluate the in-service training program.³⁹

Kinder recognized the need for in-service programs in audio-visual education and suggested the following ways to train teachers:

1. Hold institutes, workshops, demonstrations.

³⁸Ibid., p. 169.

³⁹Ned A. Flanders, "Teacher Behavior and In-service Programs," Educational Leadership, Vol. 21, pp. 25-29, October, 1963.

2. Organize audio-visual courses.
3. Provide for individual conferences between teachers and audio-visual supervisors.
4. Encourage teachers to make frequent visits to the audio-visual center.
5. Produce and distribute study guides, pamphlets, newsletters, service bulletins, and utilization suggestions.
6. Provide teachers with a comprehensive and up-to-date catalogue of materials.
7. Arrange for a collection of audio-visual books and journals in each school building.
8. Schedule previews and screening sessions.
9. Send building representatives and coordinators to selected conferences and conventions.
10. Give building coordinators some responsibility for assisting teachers in their buildings.
11. Promote inter-school and intra-school teacher visitation.
12. Encourage teacher production of instructional materials.⁴⁰

Glasgow conducted a study to "determine the relative effectiveness of four methods of in-service education in the use of radio and television in the classroom." The results were the basis for the following suggestions concerning in-service programs:

1. For problems of orientation, the workshop supplemented by printed material . . . [is the desirable method];
2. For problems of physical utilization, the visitation method and/or printed material, supplemented by workshops;
3. For problems of teaching skills unique to the media, printed material extensively supplemented by workshops and further supplemented by limited visitation . . . is

⁴⁰S. James Kinder, Audio-Visual Materials and Techniques (New York, 1959), pp. 543-44.

suggested.⁴¹

An in-service program which involved the use of televised lessons to influence teachers' attitudes toward audio-visual and to help them improve their use of audio-visual materials was the basis of a study carried out by Wittich. The findings of this study showed that there was a small but significant improvement in the use of audio-visual methods in the classroom as a result of the AV-TV course. The course resulted in a significant improvement of teacher attitude toward audio-visual concepts, even though the findings of the first application of the Teaching Methods Opinionnaire, given before the course began, showed that the teachers favored the concepts initially. The course was well received by the teachers, who emphasized their need for the type of practical information which the course provided.⁴²

⁴¹M. W. Glasgow, "A Study of the Relative Effectiveness of Selected Approaches to the In-Service Education of Teachers . ." rev. in AV Communication Review, Vol. 10, No. 3, May-June, 1962, pp. A-92 and A-93.

⁴²Walter A. Wittich, Off-Camera: A Pictorial Glimpse of AV-TV Reviewed by William H. Allen in AV Communication Review, Vol. 10, No. 6, November-December, 1962, p. A-141.

CHAPTER III

METHODOLOGY

This section of the dissertation deals with the procedure followed in: 1) Developing the questionnaire; 2) Validating the questionnaire; 3) Selecting the sample and administering the questionnaire; 4) Developing the hypotheses; and 5) Treating the data.

The Development of the Questionnaire

The questionnaire was developed with the expressed purpose of determining the availability of audio-visual equipment and materials, teachers' experience and utilization of equipment and materials, and the future needs of the audio-visual program in agriculture education in Jordan. Three forms of the questionnaire were constructed. See Appendix C. Form I was designed for vocational agriculture teachers to determine their teaching and administrative experience, their ages, their formal education, their audio-visual experience, their knowledge regarding the use and operation of audio-visual materials and equipment, and their opinions regarding the future needs of 1) audio-visual equipment and materials, and 2) the needs of teaching aids in various areas of agriculture. Form II was designed to ascertain, from the principals, the audio-visual facilities, equipment, and materials available in those schools which have a vocational agriculture department. Form III was designed to determine, from the principals of those

schools which have a vocational agriculture department, their teaching and administrative experience, their ages, their formal education, their audio-visual experience, their opinions regarding the future needs of 1) audio-visual equipment and materials, and 2) the needs of teaching aids in various areas of agriculture.

The Method of Validating the Questionnaire

The questionnaire underwent three major revisions. The first draft was submitted to three professors of audio-visual education for their evaluations and recommendations. After revision, the questionnaire was translated into the Arabic language and submitted to two university professors whose native language is Arabic for their evaluations. On the basis of their recommendations both versions of the questionnaire were revised. Then, the revised form was submitted to the writer's doctoral committee for their evaluations and recommendations. Again, the questionnaire was revised according to the recommendations of the committee.

The Selection of the Sample and Administration of the Questionnaire

The Jordanian Ministry of Education, which endorsed the study, assumed the responsibility of distributing, administering, and returning the questionnaire. The questionnaire was distributed only to those teachers and principals who are directly involved in agriculture education in Jordan. One copy of Form I was distributed to each of the 222 vocational agriculture teachers in the Jordanian public schools. Of these, 170 or 76.6 percent were returned. One copy of Form II was distributed to each of the 210 principals of schools which have

vocational agriculture departments. Of these, 150 or 71.4 percent were returned. In addition, one copy of Form III was distributed to each of those 210 principals. Of these, 98 or 46.7 percent were returned.

The Hypotheses

The null hypotheses regarding future needs of equipment, materials, and teaching aids needed in various areas of agriculture between vocational agriculture teachers and principals of schools with a vocational agriculture department are as follows:

1. There is no significant difference between the opinions of teachers and principals in regard to the need for the various types of equipment, materials, and teaching aids in each of the various areas of agriculture which are included in this study.
2. There is no significant difference between the opinions of teachers who had only a high school education and those with a junior college or university education in regard to the need for various types of equipment, materials, and teaching aids in each of the various areas of agriculture which are included in this study.
3. There is no significant difference between the opinions of teachers whose audio-visual experience was gained through formal and in-service training and those whose experience was gained from a hobby in regard to the need for the various types of equipment, materials, and teaching aids in each of the various areas of agriculture which are included in this study.
4. There is no significant difference between the opinions of the principals who had only a high school education and those principals with a junior college or university education in regard to the need

for the various types of equipment, materials, and teaching aids in each of the various areas of agriculture which are included in this study.

5. There is no significant difference between the opinions of the principals whose audio-visual experience was gained through formal and in-service training and those whose experience was gained from a hobby in regard to the need for the various types of equipment, materials, and teaching aids in each of the various areas of agriculture which are included in this study.

The Treatment of the Data

In this study the data were summarized, classified, and tabulated. Frequency and percent ratings were used on Part I of Questionnaire Forms I and II and Form III. The Mann-Whitney U test was used on Parts 2 and 3 of Questionnaire Forms I and III, which dealt with future needs.

Teachers and principals ranked each type of equipment and material according to a rank-order scale. Each scale included a choice of "Not Needed," "Important, But Not Necessary," and "Necessary for the Progress of Education," which were assigned whole number values of 1, 2, and 3, in that order. The teachers and principals also ranked the need of teaching aids in each of the problem areas in agriculture. Again, a rank-order scale was used which included the choices of "Little Need," "Some Need," "Great Need," and "Very Great Need," which were assigned whole number values of 1, 2, 3, and 4, in that order.

The assigned number values become mean ratings to determine the opinions of teachers and principals with regard to the future needs of each item classified under equipment, materials, and areas of agriculture.

A further breakdown was accomplished by dividing each group of teachers and principals into two sub-groups according to their formal education and their audio-visual experience to determine whether formal education and source of audio-visual experience have any effect on the opinions of each group.

The data were processed by the Data Computing Center of Oklahoma State University. The procedure used in analyzing the data and the findings are reported in Chapter IV.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

As outlined in Chapter III, the sample in this study included all those 222 teachers and 210 principals who are directly involved in vocational agriculture in the Jordanian public schools. The completed Form I was returned by 170 or 76.6 percent of the vocational agriculture teachers. The principals returned 150 or 71.4 percent of Form II and 98 or 46.7 percent of Form III. The data were summarized, classified, and tabulated, and are discussed under the following topics:

1. Respondents' Personal Data
2. Teachers' and Principals' Audio-Visual Experience
3. Teachers' Knowledge of Operating Audio-Visual Equipment
4. Teachers' Knowledge of Using Audio-Visual Materials
5. Teachers' Utilization of Audio-Visual Materials and Equipment
6. Availability of Audio-Visual Equipment, Materials, and Physical Facilities in the Public Schools
7. Future Needs of Audio-Visual Equipment
8. Future Needs of Audio-Visual Materials
9. Future Needs of Teaching Aids in Various Areas of Agriculture

In order to determine the nature of the findings, percent, frequency, and the Mann-Whitney U test were used to analyze the data. Mean ratings were used to determine the opinions of teachers and principals with regard to the future needs for each item classified

under equipment, materials, and areas of agriculture. A further breakdown was accomplished by dividing each group of teachers and principals into two sub-groups according to their formal education and their audio-visual experience to determine whether formal education and source of audio-visual experience have any effect on the opinions of each group.

The five percent level of significance was selected for use in this study. One asterisk appears in the tabulated form in conjunction with the statistical values which are statistically significant at the five percent level. This significance indicates a rejection of the null hypothesis. The appearance of two asterisks in the tabulated form in conjunction with the statistical values indicates a statistical significance at the one percent level, which also indicates a rejection of the null hypothesis. If the statistical values appear in the tabulated form without asterisks, these statistical values are not significant at the five percent level and the null hypothesis is retained.

Respondents' Personal Data

Teachers

The first five items of Form I of the Questionnaire deal with the teaching grade level, the teaching subject, years of age, years of teaching experience, and formal education.

Of the 170 teachers, 155 teach science courses in addition to vocational agriculture courses. The majority of the teachers are from 20 to 29 years old and the mean age is 27 years. See Table I. Sixty-five of the teachers have from one to three years of teaching experience; the mean number of years of teaching experience is five. One hundred

fifty-five of the teachers teach at the preparatory-school level, grades seven through nine. See Table II. The remaining teachers teach at the high school level. One hundred and two teachers have a junior college or university degree.

Principals

Sixty-seven of the principals are more than 29 years old; the mean age is 35 years. See Table I. Twenty-one of the principals have from four to six years of teaching experience and the mean number of years of principals' teaching experience is nine years. None of the principals reported that they teach in addition to their administrative duties. The mean number of years of principals' administrative experience is three years and 21 principals have from one to three years of administrative experience. Sixty-five of the principals have a high school diploma. See Table II.

Teachers' and Principals' Audio-Visual Experience

The primary source of teachers' audio-visual experience, as can be seen in Table III, is in-service training. Many of the principals also derived their audio-visual experience from this source, although their hobbies were of equal importance. Among both teachers and principals formal education was of less significance than either in-service training or hobbies as a source of audio-visual experience.

Of the 39 teachers who derived their audio-visual experience through in-service training, 27 are from 20 to 29 years of age. This age group includes more than two-thirds of all the teachers with audio-visual experience, as well as two-fifths of the principals. See Table III.

TABLE I
 MEAN LEVELS OF RESPONDENTS' PERSONAL CHARACTERISTICS

Characteristics	Mean Levels in Years	
	Teachers N=170	Principals N=98
Age	27	35
Teaching Experience	5	9
Administrative Experience	0	3

TABLE II
 NUMBER OF TEACHERS AND PRINCIPALS BY GRADE LEVEL
 AND FORMAL EDUCATION

Grade Level and Formal Education	Teachers N=170	Principals N=98
<u>Grade Level</u>		
Preparatory	155	94
High School	15	4
<u>Formal Education</u>		
High School Diploma	68	65
Junior College Degree	87	22
Bachelor of Science Degree	12	9
Master of Science Degree	3	2

TABLE III

NUMBER OF 170 TEACHERS AND 98 PRINCIPALS WITH AUDIO-VISUAL
EXPERIENCE BY SOURCE OF EXPERIENCE AND AGE

Age in Years	Source of Audio-Visual Experience								
	In-Service Training		Formal Education		Hobby		Total		
	T ^a	P ^b	T	P	T	P	T	P	
10 - 19	0	0	0	0	0	0	0	0	0
20 - 29	27	8	15	1	23	9	65	18	
30 - 39	11	7	2	1	8	7	21	15	
40 - 49	0	4	0	1	1	3	1	8	
50 or more	1	1	1	0	0	1	2	2	
Total	39	20	18	3	32	20	89	43	

T^a Refers to teachers.

P^b Refers to principals.

The majority of teachers who have audio-visual experience have taught from one to nine years. See Table IV. Their audio-visual experience was derived primarily from in-service training or hobbies, each of which is indicated as the source of experience by an approximately equal number of teachers. Teachers who have taught from one to three years gained their audio-visual experience almost equally from the three sources. Apparently, increased attention has been given to audio-visual education in junior colleges recently.

In-service training and hobbies provided audio-visual experience to an equal number of principals, while formal education was the source of experience of only three principals.

None of the teachers who have taught from seven to more than 16 years gained their audio-visual experience through formal education.

Most of the teachers with audio-visual experience have taught less than seven years but no such grouping occurs with the principals.

As the teachers' educational level increases, the role of formal education as a source of audio-visual experience becomes proportionally higher. See Table V. Seven of the 37 teachers with a high school diploma derived their audio-visual experience from their formal education; three of the eight teachers with either a Bachelor of Science or a Master of Science degree gained their audio-visual experience through formal education.

It is again evident, in Table V, that hobbies are of equal rank with in-service training as the source of principals' audio-visual experience. However, the increased rate of formal education as a source of audio-visual experience among those with a higher educational background is evident in this group also. For, although none of the 30

TABLE IV
NUMBER OF 170 TEACHERS AND 98 PRINCIPALS WITH AUDIO-VISUAL EXPERIENCE BY
SOURCE OF EXPERIENCE AND YEARS OF TEACHING EXPERIENCE

Teaching Experience in Years	Source of Audio-Visual Experience							
	In-Service Training		Formal Education		Hobby		Total	
	T ^a	P ^b	T	P	T	P	T	P
1 - 3	10	5	11	0	11	5	32	10
4 - 6	8	3	7	0	6	3	21	6
7 - 9	10	3	0	2	9	3	19	8
10 - 12	5	3	0	0	4	6	9	9
13 - 15	5	2	0	0	1	1	6	3
16 or More	1	4	0	1	1	2	2	7
Total	39	20	18	3	32	20	89	43

T^a Refers to teachers.

P^b Refers to principals.

TABLE V
NUMBER OF 170 TEACHERS AND 98 PRINCIPALS WITH AUDIO-VISUAL EXPERIENCE
BY SOURCE OF EXPERIENCE AND FORMAL EDUCATION

Degree	Source of Audio-Visual Experience							
	In-Service Training		Formal Education		Hobby		Total	
	T ^a	P ^b	T	P	T	P	T	P
High School Diploma	16	16	7	0	14	14	37	30
Junior College Diploma	21	3	8	1	15	5	44	9
B.S. Degree	2	1	1	1	2	1	5	3
M.S. Degree	0	0	2	1	1	0	3	1
Total	39	20	18	3	32	20	89	43

T^a Refers to teachers.

P^b Refers to Principals.

principals with a high school education gained audio-visual experience from formal education, two of the four principals who have either a Bachelor of Science or a Master of Science degree derived their audio-visual experience from their formal education. See Table V.

Summary

More teachers (89 or 52.4 percent) than principals (43 or 43.9 percent) have audio-visual experience. The majority of teachers and largest number of principals who have audio-visual experience are in the 20 to 29 year age group. It is evident that audio-visual experience tends to decrease sharply as the age reaches 40 years. The largest numbers of teachers and principals who have audio-visual experience are those who have taught from one to three years. More than two-thirds of the principals who have audio-visual experience have a high school education and nearly one-half of the teachers who have audio-visual experience have a junior college education. The largest number of teachers derived their audio-visual experience from in-service training and the next largest group derived their audio-visual experience from hobbies. Formal education was the source of audio-visual experience of the smallest group of teachers. In-service training and hobbies were sources of an equal number of principals' audio-visual experience. A small number of principals gained their audio-visual experience from their formal education.

Teachers' Knowledge of Operating Audio-Visual Equipment

Fewer than half of the total number of teachers know how to operate any of the 15 types of audio-visual equipment shown in Table VI. In

comparing the percent of teachers who can operate the various types of equipment by source of knowledge, more teachers learned to use nine types of equipment through in-service training than from the other sources. The largest number of teachers who can operate four other types of equipment gained their knowledge through their hobbies. The only type of equipment which more teachers learned to use as a result of their formal education is educational television. An equal number of teachers learned how to use a still camera through in-service training and hobbies.

In comparing formal education with hobbies as a source of audio-visual experience, more teachers learned to use 11 of the 15 types of equipment from their hobbies. An equal number of teachers learned how to operate three of the items from hobbies as from formal education.

The item with which the greatest number of teachers are familiar is educational radio. The still camera is the only other type of equipment which more than one-third of the teachers can operate. Very few teachers can operate a movie camera or use educational television programs. See Table VI.

There is a wide range in the teachers' knowledge of operating the various types of equipment listed in Table VII. Only 4.1 percent of the teachers know how to operate a movie camera as compared to 81.1 percent who can use educational radio programs in their teaching. In addition to educational radio, the only other type of equipment which more than half of the teachers can use for educational purposes is the still camera. Few of the teachers can operate most of the items; less than 30 percent know how to use nine of the 15 types of equipment.

The highest percent of teachers who can operate the most types of equipment have taught from 16 to 18 years. However, in numerical terms,

TABLE VI

PERCENT OF 170 TEACHERS WHO HAVE KNOWLEDGE IN OPERATING
AUDIO-VISUAL EQUIPMENT BY SOURCE OF EXPERIENCE

Equipment	Sources of Experience			Total
	In-Service Training	Formal Education	Hobby	
16 mm M.P. Projector	5.9	4.1	4.1	14.1
2 x 2 Slide Projector	13.6	7.1	11.8	32.5
3 $\frac{1}{4}$ x 4 Slide Projector	7.7	4.8	7.1	19.6
Filmstrip Projector	11.8	6.5	11.2	29.5
Overhead Projector	3.5	2.9	5.3	11.7
Opaque Projector	8.8	4.7	5.3	18.8
Tape Recorder	12.4	7.6	10.0	30.0
Record Player	7.6	6.5	6.5	20.6
Public Address System	4.7	3.5	3.5	11.7
Still Camera	14.1	8.8	14.1	37.0
Movie Camera	1.2	0.6	2.4	4.2
Photographic Enlarger	1.2	1.2	2.4	4.8
Duplicating Machine	3.5	2.4	4.1	10.0
Television	2.4	2.9	1.2	6.5
Radio	18.3	10.1	16.6	45.0

TABLE VII

PERCENT OF TEACHERS WHO HAVE KNOWLEDGE IN OPERATING AUDIO-VISUAL
EQUIPMENT BY YEARS OF TEACHING EXPERIENCE

Equipment	Years of Teaching Experience							Total N=170
	1-3 N=65	4-6 N=39	7-9 N=32	10-12 N=22	13-15 N=7	16-18 N=3	19-21 N=2	
16 mm M.P. Projector	13.8	20.5	18.8	4.5	14.3	66.7	0.0	15.9
2 x 2 Slide Projector	52.3	36.8	53.1	36.4	42.9	66.7	0.0	46.2
3½ x 4 Slide Projector	38.5	23.7	28.1	14.3	28.6	33.3	0.0	29.2
Filmstrip Projector	40.0	41.0	40.6	31.8	0.0	66.7	0.0	37.6
Overhead Projector	7.7	20.5	21.9	0.0	0.0	33.3	0.0	12.4
Opaque Projector	24.6	23.1	31.3	22.7	14.3	33.3	0.0	24.7
Tape Recorder	53.8	46.2	46.9	45.5	28.6	66.7	0.0	48.2
Record Player	35.4	38.5	18.8	31.8	28.6	33.3	0.0	31.8
Public Address System	23.1	15.4	12.5	13.6	14.3	0.0	0.0	17.1
Still Camera	61.5	66.7	53.1	54.5	85.7	100.0	50.0	61.8
Movie Camera	4.6	2.6	6.3	4.5	0.0	0.0	0.0	4.1
Photographic Enlarger	6.2	5.1	6.3	0.0	0.0	33.3	0.0	5.3
Duplicating Machine	15.4	17.9	18.8	9.1	14.3	0.0	0.0	15.3
Television	13.8	10.3	3.1	13.6	0.0	0.0	0.0	10.0
Radio	76.9	86.8	84.4	81.8	85.7	66.7	50.0	81.1

more of the teachers who have taught from one to three years can operate all of the types of equipment, except for the overhead projector, than any other group.

Regardless of teaching experience and formal education, the educational radio, still camera, tape recorder, 2 x 2 slide projector, and filmstrip projector are the types of equipment with which the largest number of teachers are familiar. See Tables VII and VIII.

With regard to formal education, more than half of the teachers with a Master of Science degree can operate 10 of the 15 types of audio-visual equipment. See Table VIII. Of the teachers with a Bachelor of Science degree, more than half can operate six of the items. Only three types of equipment can be operated by more than half of the teachers with a junior college degree. Among the teachers with a high school education, more than half can operate only two types of equipment.

Summary

Except for educational radio and the still camera, the percent of teachers who can operate the various types of audio-visual equipment is small. The primary source of audio-visual knowledge is in-service training.

The largest number of teachers who can operate most of the types of audio-visual equipment have from one to three years of teaching experience and a junior college degree. However, the highest percents of teachers who can operate most of the types of equipment have from 16 to 18 years of teaching experience and a Master of Science degree.

The percent figures in the total columns of every item on Table VI vary from the totals shown on Tables VII and VIII because some of

TABLE VIII

PERCENT OF 170 TEACHERS WHO HAVE KNOWLEDGE IN OPERATING
AUDIO-VISUAL EQUIPMENT BY THEIR FORMAL EDUCATION

Equipment	Formal Education				Total N=170
	High School Diploma	Junior College Degree	B.S. Degree	M.S. Degree	
	N=68	N=87	N=12	N=3	
16 mm M.P. Projector	10.3	14.9	33.3	100.0	15.9
2 x 2 Slide Projector	33.8	50.0	75.0	100.0	46.2
3½ x 4 Slide Projector	19.4	31.4	50.0	100.0	29.2
Filmstrip Projector	33.8	41.4	16.7	100.0	37.6
Overhead Projector	7.4	12.6	16.7	100.0	12.4
Opaque Projector	16.2	29.9	16.7	100.0	24.7
Tape Recorder	47.1	47.1	50.0	100.0	48.2
Record Player	30.9	27.6	58.3	66.7	31.8
Public Address System	11.8	18.4	33.3	33.3	17.1
Still Camera	58.8	62.1	66.7	100.0	61.8
Movie Camera	2.9	3.4	16.7	0.0	4.1
Photographic Enlarger	2.9	6.9	8.3	0.0	5.3
Duplicating Machine	13.2	16.1	16.7	33.3	15.3
Television	11.8	8.0	16.7	0.0	10.0
Radio	83.8	79.1	75.0	100.0	81.1

the teachers did not indicate their source of experience. For example, on Table VI the total corresponding with the 16 mm M.P. projector is 14.1 percent while on Tables VII and VIII the total for the same item is 15.9 percent.

Teachers' Knowledge of Using Audio-Visual Materials

Less than one-half of the teachers know how to use any of the materials shown in Table IX. Most of the teachers who know how to use nine of the 16 materials derived their knowledge from in-service training. The largest number of teachers who know how to use five of the types of materials gained their knowledge through hobbies. Half of the teachers who know how to use electric boards learned to do so from in-service training and half learned to use this type of material from their hobbies.

In comparing formal education with a hobby as a source of audio-visual experience, more teachers learned to use 13 of the materials from their hobbies. An equal number of teachers learned how to use educational films from hobbies as from formal education. Only about ten teachers (0.6 percent) know how to use overhead transparencies. All of these derived their experience from hobbies.

The two items which the largest number of teachers know how to use are maps and models and mockups. One-third of the teachers know how to use charts and graphs in their teaching. Less than 10 percent of the teachers know how to use the other 10 types of materials. None of the teachers know how to use magnetic boards. See Table IX.

Teachers' knowledge of using the various types of audio-visual materials varies greatly. See Table X. Only 2.4 percent know how to

TABLE IX

PERCENT OF 170 TEACHERS WHO HAVE KNOWLEDGE IN USING AUDIO-VISUAL MATERIALS BY SOURCE OF EXPERIENCE

Materials	Sources of Experience			Total
	In-Service Training	Formal Education	Hobby	
16 mm Educational Films	1.8	1.2	1.2	4.2
2 x 2 Slides	5.4	3.0	6.6	15.0
3 $\frac{1}{4}$ x 4 Slides	0.0	0.6	2.4	3.0
Filmstrips	3.6	3.0	5.4	12.0
Overhead Transparencies	0.0	0.0	0.6	0.6
Photographs	7.2	3.6	6.6	17.4
Charts & Graphs	13.8	8.4	10.8	33.0
Maps	18.7	7.8	15.1	41.6
Models and Mockups	19.2	7.2	15.6	42.0
Dioramas	0.6	0.0	0.0	0.6
Silkscreen	0.6	0.6	1.2	2.4
Felt Boards	13.7	4.8	5.4	23.9
Electric Boards	0.6	0.0	0.6	1.2
Bulletin Boards	6.5	2.4	3.0	11.9
Magnetic Boards	0.0	0.0	0.0	0.0
Displays and Exhibits	10.1	4.2	7.8	22.1

use dioramas as compared to 79 percent who know how to use models and mockups. Charts, graphs, and maps are the only other materials which more than half of the teachers know how to use for educational purposes. Few of the teachers know how to use most of the materials; less than 30 percent know how to use 11 of the 16 types of materials.

The highest percent of teachers who know how to use the most types of materials are those who have taught from seven to nine years. However, in numerical terms, more of the teachers who have taught from one to three years know how to use the largest number of materials.

Regardless of teaching experience and formal education, models, mockups, maps, charts and graphs, feltboards, and displays and exhibits are the materials with which the largest number of teachers are familiar. See Tables X and XI.

With regard to formal education, all of the teachers with a Master of Science degree can use five of the materials and more than half know how to use three other types of materials. See Table XI. More than half of the teachers with a Bachelor of Science degree can use four types of materials (2 x 2 slides, photographs, maps, and models and mockups) and none of this group can use three of the types of materials (dioramas, electric boards, and magnetic boards). Only three types of the materials (charts and graphs, maps, and models and mockups) can be used by more than half of the teachers with a junior college or high school education. However, all of the materials can be used by some members of these groups, although the actual numbers are very small.

Summary

Except for models and mockups and maps, the percent of teachers

TABLE X

PERCENT OF TEACHERS WHO HAVE KNOWLEDGE IN USING AUDIO-VISUAL
MATERIALS BY YEARS OF TEACHING EXPERIENCE

Materials	Years of Teaching Experience							Total N=170
	1-3 N=65	4-6 N=39	7-9 N=32	10-12 N=22	13-15 N=7	16-18 N=3	19-21 N=2	
16 mm Educational Films	3.1	7.7	9.4	0.0	20.0	0.0	0.0	5.4
2 x 2 Slides	21.9	15.4	28.1	23.8	20.0	0.0	0.0	21.1
3½ x 4 Slides	9.5	5.1	6.3	0.0	0.0	0.0	0.0	6.0
Filmstrips	11.1	17.9	18.8	18.2	16.7	0.0	0.0	15.0
Overhead Transparencies	1.6	7.7	6.5	0.0	0.0	0.0	0.0	3.6
Photographs	26.6	25.6	32.3	28.6	16.7	33.3	50.0	27.7
Charts & Graphs	46.9	73.7	68.8	59.1	66.7	66.7	50.0	59.9
Maps	74.6	65.8	71.9	86.4	100.0	100.0	100.0	75.3
Models & Mockups	70.8	81.6	87.5	90.9	60.0	100.0	50.0	79.0
Dioramas	1.6	2.7	6.3	0.0	0.0	0.0	0.0	2.4
Silkscreen	4.7	2.7	6.3	9.5	0.0	0.0	0.0	4.9
Felt Boards	31.3	43.6	59.4	59.1	50.0	100.0	50.0	45.2
Electric Boards	4.7	5.3	9.4	0.0	0.0	0.0	0.0	4.8
Bulletin Boards	10.9	35.9	31.3	40.9	16.7	33.3	0.0	25.0
Magnetic Boards	1.6	2.6	9.4	0.0	0.0	0.0	0.0	3.0
Displays & Exhibits	31.3	51.3	46.9	50.0	16.7	33.3	50.0	41.1

TABLE XI

PERCENT OF TEACHERS WHO HAVE KNOWLEDGE IN USING AUDIO-VISUAL
MATERIALS BY THEIR FORMAL EDUCATION

Materials	Formal Education				Total N=170
	High School Diploma N=68	Junior College Degree N=87	B.S. or B.A. Degree N=12	M.S. or M.A. Degree N=3	
16 mm Educational Films	3.0	2.4	33.3	33.3	5.4
2 x 2 Slides	10.6	17.6	83.3	100.0	21.1
3 $\frac{1}{4}$ x 4 Slides	1.5	3.5	36.4	66.7	6.0
Filmstrips	10.4	14.0	27.3	100.0	15.0
Overhead Transparencies	1.5	4.7	10.0	0.0	3.6
Photographs	24.2	24.4	54.5	100.0	27.7
Charts & Graphs	60.3	56.5	27.7	100.0	59.9
Maps	79.1	72.9	72.7	66.7	75.3
Models & Mockups	76.1	81.2	75.0	100.0	79.0
Dioramas	3.3	2.4	0.0	0.0	2.4
Silkscreen	4.6	4.8	8.3	0.0	4.9
Felt Boards	46.3	48.8	16.7	33.3	45.2
Electric Boards	6.0	4.8	0.0	0.0	4.8
Bulletin Boards	26.9	25.6	8.3	33.3	25.0
Magnetic Boards	3.0	3.6	0.0	0.0	3.0
Displays & Exhibits	43.3	41.9	16.7	66.7	41.1

who know how to use the various audio-visual materials is very small. In-service training is the primary source of audio-visual experience.

The largest number of teachers who know how to use more of the types of audio-visual materials have from one to three years of teaching experience and have a junior college degree. However, the highest percents of teachers who know how to use more of the materials have from seven to nine years teaching experience and a Master of Science degree.

Since some of the teachers did not indicate their sources of experience, the percent figures in the total column of every item on Table IX vary from the totals shown on Tables X and XI. For example, the total of teachers who know how to use 16 mm educational films is shown to be 4.2 percent on Table IX and 5.4 percent on Tables X and XI.

A higher percent of teachers indicated that they know how to operate various types of audio-visual equipment than know how to utilize the corresponding materials in their teaching. For example, 14.1 percent of the teachers know how to operate the 16 mm M.P. projector (Table VI) but only 4.2 percent know how to use 16 mm educational films (Table IX). This emphasizes a short-coming of the in-service training courses and formal education in providing basic courses in audio-visual utilization.

Teachers' Utilization of Audio-Visual Materials and Equipment

Table XIII illustrates the fact that very few teachers use audio-visual aids regularly in their teaching. Although 109 schools (72.7 percent) have radios (Table XIII), only 54 of the teachers (31.7 percent) use educational radio programs weekly. The still camera, 2 x 2 slide projector, filmstrip projector, and tape recorder are the items

that are used between one and five hours per week by between 19 and 27 teachers. Seven teachers use six of the types of equipment between six and ten hours per week. The only item which is not used weekly by any of the teachers is the movie camers, which none of the schools have. See Table XIII.

Availability of Audio-Visual Equipment, Materials, and Physical Facilities in the Public Schools

In Table XIII, the scarcity of audio-visual equipment, materials, and facilities in the schools is evident. Although 109 schools have radios, few of the schools have the other types of equipment.

While 16 schools have 2 x 2 slide projectors, only 11 schools have 100 or more slides. This would seem to suggest that in the other five schools the use of this piece of equipment is considerably limited by the lack of materials. Conversely, 20 schools have filmstrips, but only 16 schools have filmstrip projectors. Therefore, in some cases, merely having a piece of equipment or some materials is not evidence that they can be or are used. A further illustration of this may be seen in the availability of duplicating machines, which 47 schools have, and the inability of most teachers to use them. Table VII shows that only 26 teachers know how to operate a duplicating machine. The situation is not the same regarding the two schools which have motion picture projectors and no films, since educational motion picture films are very costly and are available from the Ministry of Education.

Summary

The teachers' use of audio-visual aids is very slight and undoubtedly

TABLE XII
 NUMBER OF 170 TEACHERS' USE OF EQUIPMENT BY
 NUMBER OF HOURS PER WEEK

Equipment	Number of Hours per Week	
	1-5	6-10
16 mm M.P. Projector	6	0
2 x 2 Slide Projector	21	1
3 $\frac{1}{4}$ x 4 Slide Projector	6	0
Filmstrip Projector	20	0
Overhead Projector	5	0
Opaque Projector	7	0
Tape Recorder	19	2
Record Player	12	1
Public Address System	5	0
Still Camers	27	1
Movie Camera	0	0
Photographic Enlarger	1	0
Duplicating Machine	4	1
Television	1	1
Radio	43	11

TABLE XIII

NUMBER OF 150 SCHOOLS WITH AVAILABLE EQUIPMENT, MATERIALS
AND SPACE FACILITIES BY FREQUENCY OF ITEM

Item	Items per School				Total
	One	Two	Three	Four	
<u>Equipment</u>					
16 mm M.P. Projector	2	0	0	0	2
2 x 2 Slide Projector	14	2	0	0	16
3 $\frac{1}{4}$ x 4 Slide Projector	2	0	0	0	2
Filmstrip Projector	15	1	0	0	16
Overhead Projector	1	0	0	0	1
Opaque Projector	18	1	0	0	19
Tape Recorder	24	0	0	0	24
Record Player	7	0	0	0	7
Public Address System	11	0	0	0	11
Still Camera	5	0	0	0	5
Movie Camera	0	0	0	0	0
Photographic Enlarger	0	0	0	0	0
Television Receiver	1	0	0	0	1
Radio	99	10	0	0	109
Screen	4	1	0	0	5
Projection Table	4	0	0	0	4
Duplicating Machine	9	27	2	9	47
<u>Materials</u>					
One Unit (1-100)					
2 x 2 Slides	9	1	0	1	11
One Unit (1-20)					
Filmstrips	16	1	2	1	20
16 mm Educational Films	0	0	0	0	0
<u>Space Facilities</u>					
Conference Room	23	0	0	0	23
Display Room	15	0	0	0	15
Preview Room	9	0	0	0	9
Darkroom	2	0	0	0	2
Storage	9	0	0	0	9
Auditorium	8	0	0	0	8

related to the unavailability of materials in the schools. The dearth of equipment, materials, and facilities would seem to be discouraging to the teachers with incentive to learn to use audio-visual aids.

Future Needs of Audio-Visual Equipment

The teachers and principals are closely allied in their assessment of the needs of the various types of equipment listed in Table XIV. All except two of the types of equipment are considered to be necessary for the progress of education by both teachers and principals. The two items which are judged to be important but not necessary by both groups are the record player and the movie camera. Both teachers and principals favor all types of equipment as educational tools. The principals ranked eight of the 15 types of equipment slightly higher than did the teachers. On 11 of the types of equipment the z-scores range from -0.03 to 1.77 which are not significant at the five percent level; therefore, the null hypothesis is retained. The two groups agree that these 11 items would be beneficial to the vocational agriculture program.

A highly significant difference exists between vocational agriculture teachers and principals concerning the needs of 2 x 2 slide projector. The analysis shows that 83 percent of the teachers rated this piece of equipment as necessary as compared with 68 percent of the principals. This difference in responses produced a z-score of -2.80 which is significant at the one percent level; therefore, the null hypothesis is rejected. See Appendix B, Table XXIX,a.

The opinions of teachers and principals differ significantly concerning the need of the $3\frac{1}{4}$ x 4 slide projector. Seventy-four percent of the teachers rated this item as necessary as compared with 58 percent

of the principals. A z-score of -2.81 , which is significant at the one percent level, is derived from this difference in responses and the null hypothesis is rejected. See Appendix B, Table XXIX, b.

Concerning the need of the filmstrip projector, 74 percent of the teachers as compared to 54 percent of the principals rated this item as necessary. This difference resulted in a z-score of -3.03 which is significant at the one percent level. Thus, the null hypothesis is rejected. See Appendix B, Table XXIX, c.

The opinions of teachers and principals concerning the need for the tape record differ significantly. The analysis shows that 66 percent of the principals as compared to 48 percent of the teachers rated this piece of equipment as necessary. This difference in responses produced a z-score of 3.13 which is significant at the one percent level and the null hypothesis is rejected. See Appendix C, Table XXIX, d.

The teachers were divided on the basis of their educational background to ascertain whether this has any effect on their opinions concerning the future needs of audio-visual equipment. See Table XV. The opinions of both groups, those teachers with a high school education and those with a college degree, are very closely related. The record player and movie camera were rated important but not necessary by both groups who judged the other 13 items as necessary for the progress of education. All of the types of equipment are favorably viewed as teaching aids by both groups of teachers. The teachers with a high school education ranked nine of the 15 items slightly higher than the teachers with a college education. The z-scores range from -0.02 to -1.72 on 14 of the 15 types of equipment. As these values are not significant at the five percent level, the null hypothesis is retained.

TABLE XIV
 FUTURE NEEDS OF EQUIPMENT AS PERCEIVED BY
 170 TEACHERS AND 98 PRINCIPALS

Equipment	Mean Rating (a)			
	Teachers N=170	Principals N=98	Difference	Z-Score
16 mm M.P. Proj.	2.70	2.70	0.00	0.28
2 x 2 Slide Proj.	2.81	2.63	-0.18	-2.80**
3 $\frac{1}{4}$ x 4 Slide Proj.	2.73	2.51	-0.22	-2.81**
Filmstrip Proj.	2.69	2.44	-0.25	-3.03**
Overhead Proj.	2.29	2.20	-0.09	-1.12
Opaque Proj.	2.85	2.79	-0.06	-1.31
Tape Recorder	2.32	2.61	0.29	3.13**
Record Player	1.86	1.93	0.07	0.68
P.A. System	2.22	2.39	0.17	1.51
Still Camera	2.41	2.49	0.08	1.20
Movie Camera	1.84	1.74	-0.10	-0.92
Photo Enlarger	2.16	2.33	0.17	1.77
Duplicators	2.49	2.57	0.08	0.75
Television	2.25	2.37	0.12	1.04
Radio	2.51	2.50	-0.01	-0.03

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

**Significant at the one percent level by Mann-Whitney U test.

TABLE XV
 FUTURE NEEDS OF EQUIPMENT AS PERCEIVED BY 170 TEACHERS
 ACCORDING TO THEIR FORMAL EDUCATION

Equipment	Mean Rating (a)			
	High School Diploma N=68	College Degree N=102	Difference	Z-Score
16 mm M.P. Proj.	2.68	2.71	-0.03	-0.02
2 x 2 Slide Proj.	2.75	2.86	0.11	1.12
3 $\frac{1}{4}$ x 4 Slide Proj.	2.74	2.71	-0.03	-0.72
Filmstrip Proj.	2.74	2.65	-0.09	-0.72
Overhead Proj.	2.32	2.28	-0.04	-0.39
Opaque Proj.	2.85	2.84	-0.01	-0.42
Tape Recorder	2.34	2.31	-0.03	-0.54
Record Player	1.94	1.81	-0.13	-1.06
P.A. System	2.26	2.20	-0.06	-0.33
Still Camera	2.33	2.46	0.13	1.17
Movie Camera	1.96	1.75	-0.21	-1.72
Photo Enlarger	2.23	2.11	-0.12	-0.87
Duplicators	2.44	2.53	0.09	0.92
Television	2.09	2.36	0.27	2.14*
Radio	2.44	2.56	0.12	0.97

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

*Significant at the five percent level by Mann-Whitney U test.

The two groups of teachers agree that these 14 items would be beneficial to the vocational agriculture program.

The two groups differ significantly in their opinions concerning the need of educational television. Fifty-seven percent of the teachers with a college education viewed television as necessary for the progress of education as compared with 38.2 percent of the teachers with a high school education. The z-score of 2.14 is significant at the five percent level; therefore, the null hypothesis is rejected. See Appendix B, Table XXX.

In order to determine whether the extent of formal education has any effect on the opinions of principals regarding the needs of audio-visual equipment, the principals were divided into two groups, those with a high school education and those with a college education. See Table XVI. There is a close affinity between the opinions expressed by both groups. All of the items were judged to be necessary for the progress of education by both groups of principals except for the record player and movie camera, which were viewed as important but not necessary. Both groups of principals favored all of the 15 types of equipment as educational aids. Fourteen of the items were ranked slightly higher by those principals with a college degree than by the principals with a high school education. The z-scores range from 0.02 to 1.83 on 13 of the 15 types of equipment. Since these scores are not significant at the five percent level, the null hypothesis is retained. These 13 items, both groups agree, are recommended for use in vocational agriculture programs.

Regarding the need of the still camera, the two groups differ significantly. Of the principals with a college degree, 82 percent consider

TABLE XVI

FUTURE NEEDS OF EQUIPMENT AS PERCEIVED BY 98 PRINCIPALS
ACCORDING TO THEIR FORMAL EDUCATION

Equipment	Mean Rating (a)			Z-Score
	High School Diploma N=65	College Degree N=33	Difference	
16 mm M.P. Proj.	2.70	2.72	0.02	0.04
2 x 2 Slide Proj.	2.59	2.70	0.11	1.47
3½ x 4 Slide Proj.	2.51	2.52	0.01	0.30
Filmstrip Proj.	2.37	2.58	0.21	1.43
Overhead Proj.	2.10	2.39	0.29	1.83
Opaque Proj.	2.79	2.78	0.01	0.33
Tape Recorder	2.57	2.70	0.13	0.72
Record Player	1.92	1.93	0.01	0.02
P.A. System	2.30	2.56	0.26	1.43
Still Camera	2.32	2.82	0.50	2.91**
Movie Camera	1.68	1.87	0.19	1.19
Photo Enlarger	2.29	2.42	0.13	0.98
Duplicators	2.52	2.66	0.14	1.16
Television	2.25	2.59	0.34	2.02*
Radio	2.45	2.59	0.14	0.98

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

*Significant at the five percent level by Mann-Whitney U test.

**Significant at the one percent level by Mann-Whitney U test.

the still camera as necessary as compared with 55 percent of the principals with a high school education. The resulting z-score of 2.91 is significant at the one percent level; therefore, the null hypothesis is rejected. See Appendix B, Table XXXI, a.

A high significant difference exists between the opinions of the groups of principals regarding the need for educational television. Sixty-nine percent of the principals with a college degree ranked educational television as necessary as compared with 48 percent of the principals with a high school diploma. The z-score, 2.02, is significant at the five percent level and the null hypothesis is rejected. See Appendix B, Table XXXI, b.

The teachers' opinions concerning the need of the various types of equipment differed very little regardless of whether the teachers' experience was gained from formal education and in-service training or from their hobbies. See Table XVII. Both groups of teachers consider all of the types of equipment except the record player and movie camera as necessary for the progress of education. The teachers rated the two items excepted as important but not necessary. All of the items are favored by both groups of teachers as educational tools which are needed to advance the vocational agriculture program. The teachers whose audio-visual experience was gained through hobbies rated eight of the items slightly higher than the other group whose experience was derived from formal education and in-service training. The z-scores range from -0.09 to 1.66. As none of these values are significant at the five percent level, the null hypothesis is retained. See Table XVII.

The data in Table XVIII show that when the principals were divided

TABLE XVII

FUTURE NEEDS OF EQUIPMENT AS PERCEIVED BY 89 TEACHERS
ACCORDING TO THEIR AUDIO-VISUAL EXPERIENCES

Equipment	Mean Rating (a)			
	Formal and In-Service N=57	Hobby N=32	Difference	Z-Score
16 mm M.P. Proj.	2.68	2.74	0.06	0.78
2 x 2 Slide Proj.	2.84	2.91	0.07	0.85
3 $\frac{1}{4}$ x 4 Slide Proj.	2.72	2.77	0.05	0.49
Filmstrip Proj.	2.75	2.91	0.16	1.66
Overhead Proj.	2.26	2.37	0.11	0.58
Opaque Proj.	2.88	2.94	0.06	0.71
Tape Recorder	2.30	2.21	-0.09	-0.60
Record Player	1.87	1.81	-0.06	-0.42
P.A. System	2.17	2.06	-0.11	-0.51
Still Camera	2.40	2.36	-0.04	-0.09
Movie Camera	1.76	1.97	0.21	1.21
Photo Enlarger	2.26	2.03	-0.23	-1.17
Duplicators	2.54	2.47	-0.07	-0.46
Television	2.14	2.31	0.17	0.85
Radio	2.63	2.50	-0.13	-0.92

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

into two groups based on their sources of audio-visual experience, either from formal education and in-service training or from hobbies, there was no significant difference in their opinions concerning the need of the various types of equipment.

The principals who gained their experience from their hobbies judged all of the items as necessary except for the radio, which they considered important but not necessary. The other group of principals, whose experience was derived from either formal education or in-service training, rated the movie camera in addition to the radio as important but not necessary. This group agreed with the other that the other 13 items are necessary for the progress of education. Both groups favor all of the types of equipment as desirable teaching aids. The principals who derived their audio-visual experience from hobbies rated eight of the 15 items slightly higher than did the principals who gained their audio-visual experience from in-service training or formal education. The z-score values range from -0.24 to -1.92, none of which are significant at the five percent level. Therefore, the null hypothesis is retained. See Table XVIII.

Summary

Teachers and principals do not differ in their opinions concerning the needs for 11 types of audio-visual equipment. Both groups indicated that 13 of the items are necessary for the progress of education; they rated the record player and movie camera as important but not necessary. The opinions of the teachers and principals differ significantly at the one percent level on the need for 2 x 2 slide projector, $3\frac{1}{4}$ x 4 slide projector, filmstrip projector, and tape recorder. The highest level

TABLE XVIII

FUTURE NEEDS OF EQUIPMENT AS PERCEIVED BY 43 PRINCIPALS
ACCORDING TO THEIR AUDIO-VISUAL EXPERIENCES

Equipment	Mean Rating (a)			
	Formal and In-Service N=23	Hobby N=20	Difference	Z-Score
16 mm M.P. Proj.	2.64	2.80	0.16	0.68
2 x 2 Slide Proj.	2.86	2.50	-0.36	-1.92
3 $\frac{1}{4}$ x 4 Slide Proj.	2.62	2.30	-0.32	-1.49
Filmstrip Proj.	2.29	2.58	0.29	1.20
Overhead Proj.	2.10	2.37	0.27	1.17
Opaque Proj.	2.90	2.70	-0.20	-1.56
Tape Recorder	2.70	2.65	-0.05	-0.52
Record Player	1.96	2.05	0.09	0.39
P.A. System	2.30	2.53	0.23	0.87
Still Camera	2.44	2.60	0.16	0.53
Movie Camera	1.78	1.85	0.07	0.31
Photo Enlarger	2.44	2.10	-0.34	-1.61
Duplicators	2.65	2.55	-0.10	-0.41
Television	2.44	2.35	-0.09	-0.24
Radio	2.52	2.60	0.08	0.52

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

of significance occurs in conjunction with the tape recorder. See Table XIV.

The opinions of the 68 teachers with a high school diploma and the 102 with a college degree do not differ significantly regarding the needs of 14 items and both groups favor 13 of the 15 types which they rate as necessary. The record player and movie camera were rated as important but not necessary. On one item (television) the two groups of teachers differ significantly at the five percent level. See Table XV.

The two groups of principals (65 with a high school diploma and 33 with a college degree) do not differ significantly at the five percent level in their opinions regarding 13 of the 15 types of equipment. They rated 13 of the items as necessary. The record player and movie camera they rated as important but not necessary. The two groups differ significantly at the one percent level concerning the need for the still camera. The difference in opinions regarding television is significant at the five percent level. See Table XVI.

The 57 teachers whose source of audio-visual experience was formal education and in-service training and the 32 whose source of audio-visual experience was hobbies did not differ significantly at the five percent level regarding the 15 types of equipment. Both groups rated 13 of the items as necessary for the progress of education and the record player and movie camera as important but not necessary. See Table XVII.

There was no significant difference between the opinions of the 23 principals who derived their audio-visual experience from formal education and in-service training and the 20 who derived their audio-visual experience from hobbies regarding the needs for the 15 types of audio-

visual equipment. The group with hobbies rated 14 of the 15 types of equipment as necessary and the movie camera as important but not necessary. The other group rated 13 of the 15 items as necessary and the record player and movie camera as important but not necessary. See Table XVIII.

Future Needs of Audio-Visual Materials

The opinions of teachers and principals concerning the future needs of audio-visual materials are in close accord, as seen in Table XIX. The teachers and principals evaluate dioramas as important but not necessary and the remaining 18 materials as necessary for the progress of education. All of the materials are favorably viewed as teaching aids by both groups. The principals rank 10 of the 19 materials slightly higher than the teachers; four of the materials are ranked slightly higher by the teachers than by the principals and the need for charts, graphs, and maps is ranked the same by both teachers and principals. The z-scores derived from the differences between the opinions of the teachers and principals regarding 15 of the 19 types of materials range from zero to 1.72 which are not statistically significant at the five percent level. Thus, the null hypothesis is retained. These 15 items are considered by both teachers and principals to be beneficial to the vocational agriculture program.

The difference in the opinions of teachers and principals concerning the need for 2 x 2 slides is highly significant. The analysis shows that 80 percent of the teachers as compared with 63 percent of the principals ranked this type of material as necessary for the progress of education. A z-score of -3.25 was obtained from this

TABLE XIX
 FUTURE NEEDS OF MATERIALS AS PERCEIVED BY
 170 TEACHERS AND 98 PRINCIPALS

Materials	Mean Rating (a)			Z-Score
	Teachers	Principals	Difference	
16 mm M.P. Films	2.88	2.83	-0.05	-0.13
2 x 2 Slides	2.77	2.51	-0.26	-3.25**
3½ x 4 Slides	2.70	2.48	-0.22	-2.88**
Filmstrips	2.76	2.57	-0.19	-2.68**
Transparencies	2.57	2.37	-0.20	-2.13*
Photographs	2.65	2.70	0.05	0.82
Posters	2.91	2.95	0.04	0.97
Charts & Graphs	2.95	2.95	0.00	-0.11
Models	2.92	2.94	0.02	0.00
Dioramas	1.87	1.81	-0.06	-0.48
Mounting Pictures	2.81	2.84	0.03	0.35
Silkscreen	2.20	2.35	0.15	1.54
Felt Boards	2.62	2.76	0.14	1.72
Electric Boards	2.04	2.11	0.07	0.62
Magnetic Boards	2.07	2.11	0.04	0.35
Bulletin Boards	2.73	2.83	0.10	1.15
Displays & Exhibits	2.74	2.81	0.07	0.64
Micro-Films	2.27	2.22	-0.05	-0.53
Micro-Slides	2.31	2.21	-0.10	-1.03

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

*Significant at the five percent level by Mann-Whitney U test.

**Significant at the one percent level by Mann Whitney U test.

difference. As this value is significant at the one percent level, the null hypothesis is rejected. See Appendix B, Table XXXII, a.

The teachers and principals differ significantly regarding the need for $3\frac{1}{4}$ x 4 slides. This type of material was ranked necessary for the progress of education by 76 percent of the teachers as compared with 58 percent of the principals. This difference resulted in a z-score of -2.88, which is significant at the one percent level. Therefore, the null hypothesis is rejected. See Appendix B, Table XXXII, b.

A significant difference exists between the opinions of teachers and principals concerning the need for filmstrips. The analysis shows that 81 percent of the teachers rated this type of material necessary as compared with 66 percent of the principals. The resulting z-score of -2.68 is significant at the one percent level which indicates that the null hypothesis is rejected. See Appendix B, Table XXXII, c.

Regarding the need for overhead transparencies, the opinions of teachers and principals differ significantly. Sixty-five percent of the teachers as compared with 53 percent of the principals judged this type of material as necessary for the progress of education. This difference produced a z-score of -2.13 which is significant at the five percent level. Therefore, the null hypothesis is rejected. See Appendix B, Table XXXII, d.

In order to determine whether the extent of formal education influences the teachers' opinions regarding the future needs of audio-visual materials, the teachers were divided into two groups: those with a high school education and those with a college degree. See Table XX. The opinions of both groups vary little. Both groups of teachers rated dioramas as important but not necessary and the other 18 types of

materials as necessary for the progress of education. Twelve of the 19 types of materials were rated slightly higher by the group of teachers with a college degree and five of the materials were rated slightly higher by the other group of teachers. On these 17 materials, the z-scores range from -0.19 to 1.52. As these values are not statistically significant at the five percent level, the null hypothesis is retained. These materials are considered by both groups to be beneficial to the vocational agriculture program.

A highly significant difference exists between the opinions of the teachers with a high school diploma and those with a college degree concerning the need for 16 mm educational films. Eighty-five percent of the teachers with a high school diploma rated this type of material as necessary as compared with 94 percent of the teachers with a college degree. The resulting z-score value of 2.03 is significant at the five percent level; thus, the null hypothesis is rejected. See Appendix B, Table XXXIII, a.

Concerning the need for 2 x 2 slides, the two groups differ significantly. Seventy-three percent of the teachers with a high school education as compared with 86 percent of those with a college degree rated 2 x 2 slides as necessary for the progress of education. This difference in opinions produced a z-score of 2.36 which is significant at the five percent level. Therefore, the null hypothesis is rejected. See Appendix B, Table XXXIII, b.

The principals' opinions concerning the needs for materials differed little regardless of their educational background. See Table XXI. All of the materials are considered necessary for the progress of education by both groups of principals except for dioramas, which both

TABLE XX

FUTURE NEEDS OF MATERIALS AS PERCEIVED BY 170 TEACHERS
ACCORDING TO THEIR FORMAL EDUCATION

Materials	Mean Rating (a)			
	High School Diploma N=68	College Degree N=102	Difference	Z-Score
16 mm M.P. Films	2.79	2.94	0.15	2.03*
2 x 2 Slides	2.64	2.85	0.21	2.36*
3 $\frac{1}{4}$ x 4 Slides	2.64	2.74	0.10	1.10
Filmstrips	2.76	2.77	0.01	0.19
Transparencies	2.53	2.59	0.06	0.40
Photographs	2.54	2.72	0.18	1.52
Posters	2.93	2.89	-0.04	-0.91
Charts & Graphs	2.96	2.94	-0.02	-0.19
Models	2.88	2.94	0.06	0.65
Dioramas	1.80	1.91	0.11	0.86
Mounting Pictures	2.82	2.80	-0.02	-0.46
Silkscreen	2.27	2.16	-0.11	-1.04
Felt Boards	2.70	2.58	-0.12	-0.74
Electric Boards	2.00	2.07	0.07	0.59
Magnetic Boards	2.02	2.14	0.08	0.71
Bulletin Boards	2.71	2.74	0.03	0.39
Displays & Exhibits	2.70	2.77	0.07	0.55
Micro-Films	2.25	2.28	0.03	0.32
Micro-Slides	2.24	2.34	0.09	0.76

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

*Significant at the five percent level by Mann-Whitney U test.

groups rated as important but not necessary, and magnetic boards, which was rated higher by the principals with a high school education. Both groups rated bulletin boards as equally important. All types of materials are favored by both groups of principals. Each of the groups rated eight of the materials slightly higher than the other group. The z-scores range from 0.40 to 1.54 on 17 of the 19 types of materials. As these values are not statistically significant at the five percent level, the null hypothesis is retained.

The opinions of the two groups differ significantly regarding the need for 16 mm educational films. Of the principals with a high school diploma, 80 percent rated this type of material necessary as compared to 97 percent of the principals with a college degree. This difference produced a z-score of 2.19 which is significant at the five percent level. Therefore, the null hypothesis is rejected. See Appendix B, Table XXXIV,a.

A significant difference exists between the opinions of the two groups concerning the needs for filmstrips. Sixty percent of the principals with a high school diploma as compared with 79 percent of those with a college degree consider filmstrips as necessary for the progress of education. The resulting z-score of 1.96 is significant at the five percent level; thus, the null hypothesis is rejected. See Appendix B, Table XXXIV,b.

The teachers' opinions concerning the need for audio-visual materials varied little regardless of the sources of their audio-visual experience. See Table XXII. With the exception of dioramas and electric boards, which are rated as important but not necessary, teachers rated the materials as necessary for the progress of education.

TABLE XXI

FUTURE NEEDS OF MATERIALS AS PERCEIVED BY 98 PRINCIPALS
ACCORDING TO THEIR FORMAL EDUCATION

Materials	Mean Rating (a)			
	High School Diploma N=65	College Degree N=33	Difference	Z-Score
16 mm M.P. Films	2.77	2.94	0.17	2.19*
2 x 2 Slides	2.48	2.58	0.10	1.17
3 $\frac{1}{4}$ x 4 Slides	2.46	2.52	0.06	0.60
Filmstrips	2.48	2.76	0.28	1.96*
Transparencies	2.42	2.27	-0.15	-1.19
Photographs	2.68	2.73	0.05	0.48
Posters	2.95	2.94	-0.01	-0.34
Charts & Graphs	2.94	2.97	0.03	0.66
Models	2.92	2.97	0.05	0.91
Dioramas	1.85	1.72	-0.13	-0.72
Mounting Pictures	2.88	2.77	-0.11	-1.15
Silkscreen	2.42	2.20	-0.22	-1.11
Felt Boards	2.82	2.65	-0.17	-1.15
Electric Boards	2.14	2.03	-0.11	-0.63
Magnetic Boards	2.17	1.97	-0.20	-1.21
Bulletin Boards	2.83	2.83	0.00	0.40
Displays & Exhibits	2.79	2.87	0.08	0.73
Micro-Films	2.15	2.38	0.23	1.54
Micro-Slides	2.16	2.32	0.16	0.99

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

*Significant at the five percent level by Mann-Whitney U test.

The teachers who gained their audio-visual experience through formal education and in-service training and those whose experience was derived from hobbies expressed the same opinion regarding the need for posters. The latter group rated eight of the materials slightly higher than did the former group. On 15 of the 19 types of materials the z-scores range from -0.31 to 1.53. These values are not significant at the five percent level. Thus, the null hypothesis is retained.

Concerning 2 x 2 slides, the opinions of the two groups of teachers differ significantly. Seventy-six percent of the teachers who derived their audio-visual experience from formal education and in-service training rated 2 x 2 slides as necessary as compared with 97 percent of the teachers who gained their audio-visual experience from hobbies. This difference produced a z-score of 2.54 which is significant at the five percent level; therefore, the null hypothesis is rejected. See Appendix B, Table XXXV, a.

The opinions of the two groups differ significantly regarding the needs for $3\frac{1}{4}$ x 4 slides. Sixty-seven percent of the teachers whose audio-visual experience was gained through formal education and in-service training as compared with 90 percent of the other group of teachers rated this type of material as necessary for the progress of education. The resulting z-score, 2.42, is significant at the five percent level and the null hypothesis is rejected. See Appendix B, Table XXXV, b.

A significant difference exists between the opinions of the two groups of teachers regarding the needs for feltboards. Of the teachers who derived their audio-visual experience from formal education and in-service training, 78 percent regard feltboards as necessary as compared

TABLE XXII

FUTURE NEEDS OF MATERIALS AS PERCEIVED BY 89 TEACHERS
 ACCORDING TO THEIR AUDIO-VISUAL EXPERIENCES

Materials	Mean Rating (a)			
	Formal and In-Service N=57	Hobby N=32	Difference	Z-Score
16 mm M.P. Films	2.89	2.91	0.02	0.46
2 x 2 Slides	2.72	2.97	0.25	2.54*
3½ x 4 Slides	2.60	2.90	0.30	2.42*
Filmstrips	2.77	2.91	0.14	1.21
Transparencies	2.42	2.53	0.11	0.96
Photographs	2.60	2.70	0.10	0.53
Posters	2.91	2.91	0.00	0.40
Charts & Graphs	2.96	3.00	0.04	1.06
Models	2.87	3.00	0.13	1.53
Dioramas	1.78	1.70	-0.08	-0.40
Mounting Pictures	2.84	2.91	0.07	0.72
Silkscreen	2.15	2.03	-0.12	-0.60
Felt Boards	2.72	2.42	-0.30	-2.00*
Electric Boards	1.98	1.93	-0.05	-0.31
Magnetic Boards	2.06	2.00	-0.06	-0.32
Bulletin Boards	2.80	2.66	-0.14	-1.14
Displays & Exhibits	2.84	2.72	-0.12	-0.46
Micro-Films	2.17	2.48	0.31	1.98*
Micro-Slides	2.23	2.45	0.22	1.37

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

*Significant at the five percent level by Mann-Whitney U test.

with 59 percent of the other group. This difference resulted in a z-score of -2.00 , which is significant at the five percent level. Therefore, the null hypothesis is rejected. See Appendix B, Table XXXV,c.

The two groups of teachers differ significantly in their opinions concerning micro-films. Thirty-five percent of the teachers whose audio-visual experience was derived from formal education and in-service training rated micro-films as necessary as compared with 59 percent of the other group. As the z-score, which this difference produced, is 1.98 which is significant at the five percent level, the null hypothesis is rejected. See Appendix B, Table XXXV,d.

Two groups of principals were established on the basis of their sources of audio-visual experience to determine if this would influence their opinions regarding the needs for the various materials listed in Table XXVIII. The opinions of both groups were very close. All of the materials were regarded by both groups as necessary except for two. Both groups rated dioramas as important but not necessary and the principals who gained their audio-visual experience from formal education and in-service training rated electric boards as necessary as compared to the other group which rated this item as important but not necessary. Those principals who gained their audio-visual experience from formal education and in-service training rated 10 of the materials slightly higher than the other group. The z-score values corresponding to the differences in opinions concerning 17 of the materials range from -0.08 to -1.95 . As none of these values are significant at the five percent level, the null hypothesis is retained.

The two groups differ significantly concerning the needs for felt-boards. Ninety-one percent of the principals who gained their audio-

TABLE XXIII

FUTURE NEEDS OF MATERIALS AS PERCEIVED BY 43 PRINCIPALS
ACCORDING TO THEIR AUDIO-VISUAL EXPERIENCES

Materials	Mean Rating (a)			
	Formal and In-Service N=23	Hobby N=20	Difference	Z-Score
16 mm M.P. Films	2.83	2.90	0.07	0.69
2 x 2 Slides	2.65	2.40	-0.25	-1.13
3¼ x 4 Slides	2.52	2.50	-0.02	-0.08
Filmstrips	2.52	2.50	-0.02	-0.23
Transparencies	2.26	2.42	0.16	0.78
Photographs	2.65	2.74	0.09	0.41
Posters	2.96	2.95	-0.01	-0.10
Charts & Graphs	2.91	2.95	0.04	0.47
Models	2.96	2.90	-0.06	-0.72
Dioramas	1.42	1.83	0.41	1.87
Mounting Pictures	3.00	2.84	-0.16	-1.95
Silkscreen	2.59	2.40	-0.19	-1.07
Felt Boards	2.91	2.60	-0.31	-2.05*
Electric Boards	2.36	1.90	-0.46	-2.16*
Magnetic Boards	2.27	2.00	-0.27	-1.19
Bulletin Boards	2.86	2.84	-0.02	-0.19
Displays & Exhibits	2.86	2.79	-0.07	-0.62
Micro-Films	1.95	2.25	0.30	1.37
Micro-Slides	2.05	2.21	0.16	0.70

(a) A rating of 1 means not needed.

A rating of 2 means important but not necessary.

A rating of 3 means necessary for the progress of education.

*Significant at the five percent level by Mann-Whitney U test.

visual experience from formal education and in-service training rated feltboards as necessary as compared with 65 percent of the principals whose source of audio-visual experience was hobbies. The resulting z-score of -2.05 is significant at the five percent level; thus, the null hypothesis is rejected. See Appendix B, Table XXXVI,a.

Concerning electric boards as an educational tool, the two groups differ significantly. Of the group with formal education and in-service training, 50 percent rated electric boards as necessary as compared with 15 percent of the other group. This difference produced a z-score of -2.16 which is significant at the five percent level; thus, the null hypothesis is rejected. See Appendix B, Table XXXVI,b.

Summary

The teachers and principals did not differ significantly on 15 of the 19 types of materials. Both groups rated all of the 19 types of materials as necessary except for dioramas. The two groups differed significantly at the one percent level regarding the needs for 2 x 2 slides, $3\frac{1}{4}$ x 4 slides, and filmstrips and at the five percent level regarding the need for overhead transparencies. See Table XIX.

The opinions of the 68 teachers with a high school education do not differ significantly from those of the 102 teachers with a college degree concerning the needs of 17 of the 19 types of audio-visual materials. All of the materials except dioramas were rated as necessary by both groups. Dioramas were rated as important but not necessary. The two groups differed significantly at the five percent level on the needs for 16 mm educational films and 2 x 2 slides. See Table XX.

There is no significant difference between the opinions of the 65 principals with a high school diploma and the 33 principals with a college degree regarding the needs of 17 of the 19 types of materials. Both groups rated all of the materials as necessary for the progress of education except for dioramas, which they rated as important but not necessary, and magnetic boards which the principals with a college degree rated as important but not necessary. The two groups differ significantly at the five percent level regarding the needs for 16 mm educational films and filmstrips. See Table XXI.

The opinions of 57 teachers who gained their audio-visual experience from formal education and in-service training differ little from the opinions of 32 teachers who derived their experience from hobbies regarding the needs for 15 of the 19 materials. Both groups rated 17 types of materials as necessary and two as important but not necessary. The two groups differ significantly at the five percent level regarding the need for 2 x 2 slides, 3 $\frac{1}{4}$ x 4 slides, feltboards and micro-films. See Table XXII.

There is no significant difference between the opinions of the 23 principals whose audio-visual experience was derived from formal education and in-service training and the 20 who gained their audio-visual experience from hobbies concerning 17 of the 19 materials. All of the materials except two were rated as necessary by both groups, who agreed that dioramas are important but not necessary. Micro-films are considered important by the principals who gained their audio-visual experience from formal education and in-service training and necessary by the other group of principals. Another lack of agreement between the two groups concerns electric boards which the first group considered as

necessary and the second group considered as important. The two groups differ significantly at the five percent level on the need for felt-boards and electric boards. See Table XXIII.

Future Needs of Teaching Aids in Various Areas of Agriculture

In general, principals and teachers agree on the needs for teaching aids in the various areas of agriculture as seen in Table XXIV. Both groups indicate that there is a very great need for teaching aids in 26 areas of agriculture and a great need in eight areas. Teachers judged that one area, keeping and interpreting farm records and accounts, has a great need as contrasted with principals who indicated that a very great need exists in this area. The z-scores corresponding to the responses of the groups concerning the needs for teaching aids in 31 of the 35 areas of vocational agriculture range from -0.08 to 1.88. These scores are not significant at the five percent level; thus, the null hypothesis is retained. Teachers and principals agree on the degree of need for teaching aids regarding these 31 areas.

The two groups differ significantly regarding the need for teaching aids in teaching irrigation. Forty percent of the teachers indicated that there is a very great need in this area as compared to 55 percent of the principals. The difference in opinions produced a z-score of 2.71 which is significant at the one percent level; therefore, the null hypothesis is rejected. See Appendix B, Table XXXVII, a.

There is a significant difference between the opinions of teachers and principals regarding the need for teaching aids in teaching about marketing farm crops. According to 53 percent of the teachers there is a very great need for educational tools in this area as compared with

TABLE XXIV

FUTURE NEEDS FOR TEACHING AIDS IN AGRICULTURE AS PERCEIVED
BY 170 TEACHERS AND 98 PRINCIPALS

Areas in Agriculture	Mean Rating (a)			Z-Score
	Teachers	Principals	Difference	
Helping Adult Farmers	3.85	3.94	0.09	1.88
Student Farmer Organization	2.51	2.65	0.14	1.14
Management in Agriculture	3.15	3.32	0.17	1.59
Farm Organizations	2.79	2.94	0.15	1.08
Livestock Selection	3.65	3.66	0.01	0.37
Poultry Selection	3.67	3.68	0.01	0.48
Feeding Livestock	3.65	3.62	-0.05	-0.91
Feeding Poultry	3.68	3.59	-0.09	-1.16
Breeding & Improving Herds & Flocks	3.60	3.58	-0.10	-0.09
Controlling Parasites in Animals	3.80	3.81	0.01	0.45
Controlling Animal Diseases	3.79	3.83	0.03	0.65
Bee-Keeping	2.85	2.78	-0.07	-0.66
Seed and Plant Selection	3.71	3.76	0.05	0.86
Plant Propagation	3.01	3.00	-0.01	-0.08
Tillage Practices with Crops	2.86	2.79	-0.07	-0.63
Crop Rotation	3.64	3.66	0.02	0.24
Harvesting Crops	3.20	3.26	0.06	0.82
Controlling Insects	3.83	3.79	-0.04	-1.26
Controlling Plant Diseases	3.80	3.74	-0.06	-0.98
Fertilization	3.57	3.68	0.11	1.26
Irrigation	3.01	3.34	0.33	2.71**
Pasture Management	2.79	2.96	0.17	1.40
Producing Vegetables	3.48	3.45	-0.03	-0.50

TABLE XXIV (CONTINUED)

Areas in Agriculture	Mean Rating (a)			
	Teachers	Principals	Difference	Z-Score
Producing Fruits	3.48	3.42	-0.06	-0.34
Dairy Production Management	3.38	3.36	-0.02	-0.68
Keeping & Interpreting Farm Records and Accounts	2.89	3.05	0.16	1.43
Marketing Livestock & Livestock Products	3.13	3.33	0.20	1.34
Marketing Dairy Products	3.13	3.29	0.16	0.98
Marketing Farm Crops	3.31	3.35	0.22	1.96*
Analyzing Production & Marketing Practices	3.18	3.42	0.24	2.14*
Selecting Farm Machinery	3.02	3.22	0.20	1.69
Agricultural Workshops	2.50	2.76	0.26	2.03*
Metalwork	2.12	2.33	0.21	1.40
Woodwork	2.11	2.34	0.23	1.61
Soil and Water Conservation	3.35	3.56	0.21	1.48

- (a) A rating of 1 means little need.
 A rating of 2 means some need.
 A rating of 3 means great need.
 A rating of 4 means very great need.

*Significant at the five percent level by Mann-Whitney U test.

**Significant at the one percent level by Mann-Whitney U test.

65 percent of the principals. The resulting z-score is significant at the five percent level. Therefore, the null hypothesis is rejected. See Appendix B, Table XXXVII,b.

Regarding the need for educational tools in teaching analyzing production and marketing practices, the teachers and principals differed significantly. Forty-four percent of the teachers as compared with 57 percent of the principals indicated a very great need for teaching aids in this area. The z-score of 2.14 is significant at the five percent level. Therefore, the null hypothesis is rejected. See Appendix B, Table XXXVII,c.

The opinions of teachers and principals differed significantly regarding the need for teaching aids in agriculture workshops. Of the teachers, 20 percent indicated that there is a great need for educational tools in this area as compared with 29 percent of the principals. The resulting z-score of 2.03 is significant at the five percent level. Thus, the null hypothesis is rejected. See Appendix B, Table XXXVII,d.

There is a high degree of concensus between the opinions of teachers with a high school degree and those with a college degree concerning the needs for teaching aids in vocational agriculture. See Table XXV. Both groups agree that a very great need exists in 25 of the 35 areas and that there is a great need in 10 areas. The teachers with a high school diploma indicate a slightly greater need in 18 of the areas and the teachers with a college education indicated a slightly greater need in the other 17 areas. The z-scores range from 0.05 to -1.61, none of which are significant at the five percent level. Therefore, the null hypothesis is retained. Regardless of educational background, the teachers agree that educational tools are needed in all the various

TABLE XXV

FUTURE NEEDS FOR TEACHING AIDS IN AGRICULTURE AS PERCEIVED BY
170 TEACHERS ACCORDING TO THEIR FORMAL EDUCATION

Areas in Agriculture	Mean Rating (a)			Z-Score
	High School Diploma N=68	College Degree N=102	Difference	
Helping Adult Farmers	3.87	3.83	-0.04	-0.56
Student Farmer Organization	2.59	2.46	-0.13	-0.86
Management in Agriculture	3.15	3.14	-0.01	-0.30
Farm Organizations	2.74	2.82	0.08	0.48
Livestock Selection	3.64	3.66	0.02	0.27
Poultry Selection	3.63	3.69	0.06	0.50
Feeding Livestock	3.67	3.63	-0.04	-0.49
Feeding Poultry	3.72	3.65	-0.07	-0.70
Breeding & Improving Herds & Flocks	3.61	3.59	-0.02	-0.41
Controlling Parasites in Animals	3.79	3.80	0.01	0.31
Controlling Animal Diseases	3.85	3.75	-0.10	-1.41
Bee-Keeping	3.87	2.83	-0.04	-0.13
Seed and Plant Selection	3.72	3.70	0.02	0.05
Plant Propagation	3.05	2.99	-0.06	-0.49
Tillage Practices with Crops	2.93	2.81	-0.12	-0.27
Crop Rotation	3.70	3.59	-0.11	-1.07
Harvesting Crops	3.19	3.20	-0.01	-0.13
Controlling Insects	3.88	3.80	-0.08	-1.10
Controlling Plant Diseases	3.79	3.81	0.02	0.08
Fertilization	3.65	3.51	-0.14	-1.61
Irrigation	2.96	3.05	0.09	0.58

TABLE XXV (CONTINUED)

Areas in Agriculture	Mean Rating (a)			
	High School Diploma N=68	College Degree N=102	Difference	Z-Score
Pasture Management	2.73	2.83	0.10	0.66
Producing Vegetables	3.49	3.48	-0.01	-0.21
Producing Fruits	3.42	3.52	0.10	0.59
Dairy Production Management	3.26	3.35	0.09	0.32
Keeping & Interpreting Farm Records and Accounts	2.96	3.00	0.04	0.33
Marketing Livestock & Livestock Products	3.22	3.47	0.25	1.26
Marketing Dairy Products	3.30	3.37	0.07	0.48
Marketing Farm Crops	3.48	3.60	0.12	0.93
Analyzing Production & Marketing Practices	3.48	3.58	0.10	0.33
Selecting Farm Machinery	3.04	3.40	0.36	1.45
Agricultural Workshops	2.70	2.68	-0.02	-0.05
Metalwork	2.18	2.45	0.27	0.81
Woodwork	2.14	2.37	0.23	0.73
Soil and Water Conservation	3.57	3.48	-0.10	-0.43

- (a) A rating of 1 means little need.
 A rating of 2 means some need.
 A rating of 3 means great need.
 A rating of 4 means very great need.

areas of agriculture education.

The opinions of principals with a high school diploma and those with a college degree differ little concerning the need for educational tools in teaching the areas of vocational agriculture. See Table XXVI. The principals with a high school degree indicated that a slightly higher need for teaching aids exists in 18 of the areas and the other group indicated that there is a slightly greater need in the other 16 areas. The z-scores range from 0.13 to -1.92 which are not significant at the five percent level; thus, the null hypothesis is retained.

The opinions of the two groups of principals differ significantly concerning the need for teaching aids in teaching seed and plant selection. Eighty-nine percent of the principals with a high school diploma indicated that a very great need exists in this area as compared with 70 percent of the principals with a college degree. This difference produced a z-score of -2.23 which is significant at the five percent level. Therefore, the null hypothesis is rejected. See Appendix B, Table XXXVIII.

The teachers were divided into two groups on the basis of the sources of their audio-visual experience to ascertain whether this difference would have any effect on their attitudes concerning the future needs of audio-visual aids in the various areas of vocational agriculture. See Table XXVII. Teaching aids were estimated to be very greatly needed in 22 of the areas and greatly needed in 13 of the areas by those teachers whose audio-visual experience was gained from formal education and in-service training. The other group of teachers, who derived their audio-visual experience from hobbies, indicated that a very great need for educational tools exists in 23 of the areas, a great need exists in

TABLE XXVI

FUTURE NEEDS FOR TEACHING AIDS IN AGRICULTURE AS PERCEIVED BY
98 PRINCIPALS ACCORDING TO THEIR FORMAL EDUCATION

Areas in Agriculture	Mean Rating (a)			
	High School Diploma N=65	College Degree N=33	Difference	Z-Score
Helping Adult Farmers	3.91	4.00	0.09	1.45
Student Farmer Organization	2.63	2.70	0.07	0.39
Management in Agriculture	3.30	3.36	0.06	0.23
Farm Organizations	2.85	3.12	0.27	1.22
Livestock Selection	3.71	3.58	-0.13	-0.75
Poultry Selection	3.69	3.67	-0.02	-0.15
Feeding Livestock	3.66	3.59	-0.17	-1.28
Feeding Poultry	3.63	3.52	-0.11	-0.53
Breeding & Improving Herds & Flocks	3.63	3.59	-0.14	-0.71
Controlling Parasites in Animals	3.80	3.82	-0.02	-0.31
Controlling Animal Diseases	3.86	3.76	-0.10	-0.84
Bee-Keeping	2.83	2.67	-0.16	-0.78
Seed and Plant Selection	3.82	3.64	-0.18	-2.23*
Plant Propagation	3.03	2.94	-0.09	-0.56
Tillage Practices with Crops	2.69	2.97	0.28	1.39
Crop Rotation	3.69	3.61	-0.08	-0.14
Harvesting Crops	3.23	3.32	0.09	0.50
Controlling Insects	3.74	3.88	0.14	1.20
Controlling Plant Diseases	3.74	3.75	0.01	0.13
Fertilization	3.75	3.55	-0.20	-1.92
Irrigation	3.46	3.21	-0.19	-0.78

TABLE XXVI (CONTINUED)

Areas in Agriculture	Mean Rating (a)			
	High School Diploma N=65	College Degree N=33	Difference	Z-Score
Pasture Management	2.97	2.94	-0.03	-0.29
Producing Vegetables	3.40	3.55	0.15	0.77
Producing Fruits	3.34	3.58	0.24	1.10
Dairy Production Management	3.28	3.52	0.24	1.30
Keeping & Interpreting Farm Records and Accounts	2.99	3.19	0.20	0.92
Marketing Livestock & Livestock Products	3.28	3.44	0.16	0.71
Marketing Dairy Products	3.31	3.25	-0.06	-0.36
Marketing Farm Crops	3.55	3.49	-0.06	-0.63
Analyzing Production & Marketing Practices	3.48	3.31	-0.17	-1.25
Selecting Farm Machinery	3.28	3.12	-0.16	-1.06
Agricultural Workshops	2.82	2.66	-0.16	-0.84
Metalwork	2.23	2.53	0.30	1.31
Woodwork	2.26	2.52	0.26	1.14
Soil and Water Conservation	3.57	3.53	-0.04	-0.15

- (a) A rating of 1 means little need.
 A rating of 2 means some need.
 A rating of 3 means great need.
 A rating of 4 means very great need.

*Significant at the five percent level by Mann-Whitney U test.

TABLE XXVII

FUTURE NEEDS FOR TEACHING AIDS IN AGRICULTURE AS PERCEIVED BY 89
TEACHERS ACCORDING TO THEIR AUDIO-VISUAL EXPERIENCES

Areas in Agriculture	Mean Rating (a)			
	Formal and In-Service N=57	Hobby N=32	Difference	Z-Score
Helping Adult Farmers	3.87	3.84	-0.03	-1.10
Student Farmer Organization	2.53	2.23	-0.30	-1.20
Management in Agriculture	3.20	2.97	-0.33	-0.90
Farm Organizations	2.82	2.63	-0.19	-0.93
Livestock Selection	3.67	3.69	0.02	0.19
Poultry Selection	3.66	3.69	0.03	0.36
Feeding Livestock	3.69	3.66	-0.02	-0.18
Feeding Poultry	3.64	3.75	-0.11	-0.80
Breeding & Improving Herds & Flocks	3.60	3.69	0.09	0.73
Controlling Parasites in Animals	3.80	3.91	0.11	0.76
Controlling Animal Diseases	3.78	3.91	0.13	0.97
Bee-Keeping	2.74	2.91	0.17	0.88
Seed and Plant Selection	3.64	3.75	0.11	0.67
Plant Propagation	2.91	3.28	0.37	1.59
Tillage Practices with Crops	2.69	2.75	0.06	0.20
Crop Rotation	3.56	3.50	-0.06	-0.44
Harvesting Crops	3.29	3.09	-0.20	-1.60
Controlling Insects	3.82	3.88	0.06	0.69
Controlling Plant Diseases	3.82	3.88	0.06	0.69
Fertilization	3.44	3.55	0.11	0.45
Irrigation	2.98	2.84	-0.14	-0.68

TABLE XXVII (CONTINUED)

Areas in Agriculture	Mean Rating (a)			
	Formal and In-Service N=57	Hobby N=32	Difference	Z-Score
Pasture Management	2.86	2.78	-0.08	-0.33
Producing Vegetables	3.42	3.47	0.04	0.44
Producing Fruits	3.36	3.47	0.11	0.45
Dairy Production Management	3.43	3.34	-0.09	-0.19
Keeping & Interpreting Farm Records and Accounts	2.80	2.66	-0.14	-0.57
Marketing Livestock & Livestock Products	3.22	3.06	-0.16	-1.22
Marketing Dairy Products	3.27	3.03	-0.24	-1.15
Marketing Farm Crops	2.46	3.13	-0.33	-1.86
Analyzing Production & Marketing Practices	3.27	3.00	-0.27	-1.36
Selecting Farm Machinery	2.98	2.81	-0.17	-1.08
Agricultural Workshops	2.47	2.34	-0.13	-0.70
Metalwork	2.06	1.84	-0.22	-0.98
Woodwork	2.07	1.84	-0.23	-1.32
Soil and Water Conservation	3.40	3.40	0.00	0.17

- (a) A rating of 1 means little need.
 A rating of 2 means some need.
 A rating of 3 means great need.
 A rating of 4 means very great need.

10 of the areas, and there is some need in two areas. The teachers who gained their audio-visual experience from formal education and in-service training rated the need in 18 of the areas as slightly higher than did the other group. The z-scores range from 0.17 to -1.86. As none of these values is significant at the five percent level, the null hypothesis is retained. Teaching aids are considered needed in all of the areas of vocational agriculture.

The opinions of principals regarding the needs of teaching aids in the various areas of vocational agriculture differ little regardless of the sources of the principals' audio-visual experience. See Table XXVIII. Principals who gained their audio-visual experience from formal education and in-service training indicated that there is a very great need for audio-visual aids in 28 of the 35 areas of agriculture as compared with the other group of principals who indicated that in 26 areas there is a very great need for teaching aids. The teachers who derived their audio-visual experience from hobbies indicated that a slightly higher need for teaching aids exists in 24 of the 35 areas. These differences in opinions produced z-scores from -0.05 to 1.86. As these values are not significant at the five percent level, the null hypothesis is retained.

Summary

Regarding the needs for teaching aids in the various areas of agriculture, the teachers and principals do not differ significantly on 31 of the 35 areas. Both groups indicated that a very great need for teaching aids exists in 26 of the 35 areas of vocational agriculture. They indicated that there is a great need in eight of the areas. The

TABLE XXVIII

FUTURE NEEDS FOR TEACHING AIDS IN AGRICULTURE AS PERCEIVED BY 43
PRINCIPALS ACCORDING TO THEIR EXPERIENCE IN AUDIO-VISUAL

Areas in Agriculture	Mean Rating (a)			
	Formal and In-Service N=23	Hobby N=20	Difference	Z-Score
Helping Adult Farmers	3.87	3.95	0.08	0.50
Student Farmer Organization	3.83	2.80	-0.04	-0.28
Management in Agriculture	3.41	3.00	-0.41	-1.68
Farm Organizations	2.74	3.00	0.26	1.00
Livestock Selection	3.70	3.85	0.15	1.26
Poultry Selection	3.70	3.80	0.10	0.53
Feeding Livestock	3.52	3.80	0.28	1.18
Feeding Poultry	3.44	3.85	0.41	1.86
Breeding & Improving Herds & Flocks	3.52	3.75	0.23	0.91
Controlling Parasites in Animals	3.87	3.75	-0.12	-1.01
Controlling Animal Diseases	3.78	3.95	0.17	1.27
Bee-Keeping	2.87	2.75	-0.12	-0.53
Seed and Plant Selection	3.70	3.90	0.20	0.77
Plant Propagation	3.00	2.75	-0.25	-0.92
Tillage Practices with Crops	2.57	2.80	0.23	0.90
Crop Rotation	3.70	3.60	-0.10	-0.42
Harvesting Crops	3.09	3.00	-0.09	-0.51
Controlling Insects	3.61	3.70	0.09	0.87
Controlling Plant Diseases	3.57	3.84	0.27	1.69
Fertilization	3.48	3.75	0.27	1.39
Irrigation	3.30	2.80	-0.50	-1.85

TABLE XXVIII (CONTINUED)

Areas in Agriculture	Mean Rating (a)			Z-Score
	Formal and In-Service N=23	Hobby N=20	Difference	
Pasture Management	3.09	2.90	-0.19	-0.57
Producing Vegetables	3.26	3.40	0.14	0.48
Producing Fruits	3.22	3.40	0.18	0.71
Dairy Production Management	3.26	3.35	0.09	0.32
Keeping & Interpreting Farm Records and Accounts	2.96	3.00	0.04	0.33
Marketing Livestock & Livestock Products	3.22	3.47	0.25	1.26
Marketing Dairy Products	3.30	3.37	0.07	0.48
Marketing Farm Crops	3.48	3.60	0.12	0.95
Analyzing Production & Marketing Practices	3.48	3.48	0.10	0.33
Selecting Farm Machinery	3.04	3.40	0.36	1.45
Agricultural Workshops	2.70	2.68	-0.02	-0.05
Metalwork	2.18	2.45	0.27	0.81
Woodwork	2.14	2.37	0.23	0.73
Soil & Water Conservation	3.57	3.48	-0.10	-0.43

- (a) A rating of 1 means little need.
 A rating of 2 means some need.
 A rating of 3 means great need.
 A rating of 4 means very great need.

teachers and principals indicated that there is a very great need for teaching aids in most areas of agriculture. The greatest need of teaching aids exists in the area of helping adult farmers, and the least need is in the areas of metalwork and woodwork, according to both groups. The two groups differ significantly at the one percent level on the need for audio-visual aids for teaching irrigation and at the five percent level concerning the needs of audio-visual aids for teaching marketing farm crops, analyzing production and marketing practices, and agricultural workshops. See Table XXIV.

There is no significant difference at the five percent level between the opinions of the 68 teachers with a high school diploma and the 102 teachers with a college degree. Thus, the null hypothesis is retained. Both groups indicated there is a very great need for teaching aids in the various areas of agriculture. Both groups ranked the area of helping adult farmers as having the greatest need for teaching aids. See Table XXV.

There were no significant differences at the five percent level on the 33 areas of agriculture between the 65 principals with a high school diploma and the 35 principals with a junior college or university degree. The two groups differed significantly at the five percent level regarding only the needs of audio-visual aids in teaching seed and plant selection. Both of the groups indicated that there is a very great need for teaching aids in most of the areas of vocational agriculture. See Table XXVI.

The 98 teachers who were divided into two groups according to their sources of audio-visual experience and the 43 principals who were similarly divided, did not differ significantly at the five percent level

regarding the need for teaching aids in the various areas of vocational agriculture. These groups indicated that there is a very great need for teaching aids in most of the areas. See Tables XXVII and XXVIII.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Procedures

The purpose of this study was to determine the availability, utilization, and projected needs of audio-visual aids for agricultural education teachers in the Jordanian public schools, based on the needs and goals of vocational agriculture of the country and on the principles which, according to literature and research, have been found successful in this field, especially in the United States.

The normative survey method of research, which employed a questionnaire, was used in this study. Three forms of the questionnaire were administered to collect the data. The Jordanian Ministry of Education assumed the responsibility of distributing, administering, and returning the questionnaire. The questionnaire was distributed only to those teachers and principals who are directly involved in agriculture education in Jordan. One copy of Form I was distributed to each of the 222 vocational agriculture teachers in the Jordanian public schools. Of these, 170 (76.6 percent) were returned. One copy of Form II was distributed to each of the 210 principals of schools which have vocational agriculture departments. Of these, 150 (71.4 percent) were returned. In addition, one copy of Form III was distributed to each of those 210 principals. Of these, 98 (46.7 percent) were returned.

In order to determine the nature of the findings, frequency, percent and mean rating were used to analyze the responses of the teachers and principals. In addition, the Mann-Whitney U test, using a five percent level of significance, was employed to determine if there were statistically significant differences between the opinions of teachers and principals regarding each item listed under future needs of 1) equipment, 2) materials, and 3) problem areas in agriculture.

Summary of Findings and Conclusions

The sample in this study involves 150 schools which have a vocational agriculture department, 98 principals of these schools, and 170 teachers who represent the total population of schools, principals, and teachers who are directly involved in the agricultural education program in the Jordanian public schools. The conclusions in this study are based only on the responses of this sample population. Any projections must be made with this limitation in mind.

The data were summarized and organized under nine major topics. A brief summary of the findings relating to each topic and the conclusions follow.

Topic 1: Respondents' Personal Data

Findings: The majority of teachers (75 percent) are less than 30 years old and 38 percent have taught from one to three years. Sixty percent have a junior college or university degree and all teach science courses in addition to vocational agriculture courses. Of the principals, 68 percent are more than 29 years old and 21.4 percent have taught from four to six years. Sixty-six percent have a high school education only and the remaining 34 percent have more than a high school education;

21.4 percent have from one to three years administrative experience.

Conclusions: The relatively large numbers of young teachers and principals who have taught only a few years indicate a rising emphasis on vocational agriculture in the country. In addition, the younger beginning teachers have more formal education because the minimum requirement for new teachers has recently been raised to a junior college education.

Topic 2: Teachers' and Principals' Audio-Visual Experience

Findings: Only 89 of the 170 teachers and 43 of the 98 principals reported their sources of audio-visual experience. The majority of both groups derived their experience primarily from in-service training; the second source was hobbies and the smallest number gained their experience through formal education. The majority of both groups who reported audio-visual experience are in the youngest age group; therefore, they have fewer years of teaching experience. Forty-four or approximately half of the teachers who have audio-visual experience have a junior college education, 37 teachers have a high school education, and only eight have a university degree. More than two-thirds of the principals with audio-visual experience have a high school education only.

Conclusions: The number of teachers and principals who have audio-visual experience is relatively small. Although in-service training is the primary source of experience, it apparently does not meet the need as approximately half of the teachers have no audio-visual experience and about one-third of the teachers who do have audio-visual experience relied on hobbies as their source of experience. Also as none of the respondents reported that they were participating in any type of audio-visual training at the time this study was conducted, the absence of appropriate programs is evident.

Topic 3: Teachers' Knowledge of Operating Audio-Visual Equipment

Findings: The only items with which more than half of the teachers are familiar are the radio and still camera. Nearly half of the teachers know how to operate the tape recorder and 2 x 2 slide projector and approximately one-third can operate a $3\frac{1}{4}$ x 4 slide projector, filmstrip projector, and record player. Very few teachers know how to operate the remaining eight types of audio-visual equipment. The largest number of teachers who can operate the most types of audio-visual equipment have taught from one to three years and have a junior college education.

Conclusions: Few teachers know how to operate the various types of audio-visual equipment and their knowledge, for the most part, is limited to the few types of equipment which are most widely available. Formal education contributes very little to teachers' knowledge and the experience needed for the use of audio-visual aids.

Topic 4: Teachers' Knowledge of Using Audio-Visual Materials

Findings: More than half of the teachers know how to utilize charts, graphs, maps, models, and mockups. Slightly fewer than half the teachers can utilize feltboards, displays and exhibits; and about one-fifth to one-fourth know how to use photographs, bulletin boards, and 2 x 2 slides. Very few teachers can utilize the remaining materials included in this study.

Conclusions: The majority of teachers do not know how to utilize many of the materials which could be used to enrich their teaching. Fewer teachers can utilize the audio-visual materials in their teaching than know how to operate the corresponding equipment. Therefore, it is apparent that there is a need for instruction in audio-visual utilization.

Topic 5: Teachers' Utilization of Audio-Visual Materials and Equipment

Findings: Forty-three teachers use the radio for educational purposes from one to five hours per week and 11 teachers use the same media from six to ten hours per week. Twenty-seven teachers use the still camera for producing educational materials from one to five hours per week. Approximately 20 teachers use the filmstrip projector, and 2 x 2 slide projector between one and five hours per week. From 12 to 19 teachers use the record player and tape recorder from one to five hours per week. Between one to seven teachers use the seven other types of educational media from one to five hours per week. Only seven teachers use six different types of teaching aids from six to ten hours per week.

Conclusions: Teachers' use of materials and equipment is slight and is undoubtedly related to the availability of such teaching aids in the schools.

Topic 6: Availability of Audio-Visual Equipment, Materials, and Physical Facilities in the Schools

Findings: The scarcity of equipment, materials, and physical facilities in the schools is evident. More than two-thirds of the 150 schools have radios and nearly one-third have duplicating machines. Only 24 of the schools have a tape recorder, 19 have opaque projectors, 16 have 2 x 2 slide projectors and filmstrip projectors, 11 have public address systems, and from one to five schools have eight different types of equipment. Twenty schools have from one to 20 filmstrips, nine schools have from one to one hundred 2 x 2 slides, and only two schools have more than 100 slides. Sixteen schools have from one to 20 filmstrips and four schools have more than 20 filmstrips. From two to nine schools have a preview room, darkroom, storage, and auditorium. From 15 to 23

schools have a conference room and a display room.

Conclusions: The lack of equipment, materials, and physical facilities no doubt discourages the teachers from learning to use such teaching aids. In some cases the schools have equipment or materials that are not complementary which results in a situation in which the efficient use of these aids is not probable.

Topic 7: Future Needs of Audio-Visual Equipment

Findings: The opinions of the 170 teachers and 98 principals did not differ significantly concerning the needs for most of the types of audio-visual equipment. However, there were high significant differences among them concerning the 2 x 2 slide projector, $3\frac{1}{4}$ x 4 slide projector, filmstrip projector, and tape recorder. It is possible that the teachers' higher level of education and wider audio-visual experience accounted for these higher ratings.

Teachers and principals differ significantly among themselves regarding the needs of educational television. The teachers and principals with a college education rated this media higher than those with a high school degree. With the exception of this item, teachers did not differ significantly among themselves regardless of educational background and audio-visual experience regarding the needs for the different types of audio-visual equipment. In addition to the need for educational television, principals also differed significantly among themselves concerning the needs for the still camera which those principals with a college education rated higher than those with a high school education. With the exception of these two types of equipment, the principals' opinions were in close agreement.

Conclusion: In general, teachers and principals feel strongly that all

of the various types of equipment are needed for the progress of education. Even though some significant differences were expressed, they were differences regarding the extent of needs rather than a complete disagreement or a denial of need.

Topic 8: Future Needs of Audio-Visual Materials

Findings: Teachers and principals did not differ significantly concerning the needs for most types of audio-visual materials. However, both groups differed significantly regarding 2 x 2 slides, 3 $\frac{1}{4}$ x 4 slides, filmstrips, and overhead transparencies. Teachers rated these four types higher than the principals. Again, it is possible to assume that the teachers' higher level of education and wider audio-visual experience are the factors which influenced their different opinions.

The 68 teachers with a high school education and the 102 teachers with a junior college or university education differed significantly concerning the needs for 16 mm educational films and 2 x 2 slides. The teachers with more formal education rated these two types higher than those with a high school education. It was somewhat surprising that the 32 teachers who derived their audio-visual experience from hobbies rated 2 x 2 slides, 3 $\frac{1}{4}$ x 4 slides, and micro-films significantly higher than those 57 teachers whose audio-visual experience was derived from formal education and in-service training. However, the latter group rated feltboards significantly higher than did the teachers whose source of audio-visual experience was hobbies.

The 65 principals with a high school education and the 33 principals with a college education differed significantly concerning the needs for 16 mm educational films and filmstrips. The principals with a college degree rated the needs of these two types of materials higher

than those principals with a high school education. The 23 principals who derived their audio-visual experience from formal education and in-service training and the 20 whose audio-visual experience was derived from hobbies differed significantly regarding the needs for feltboards and electric boards. The former group rated the needs of these two types of materials significantly higher.

Conclusions: Both teachers and principals consider most of the types of materials as necessary for the progress of education. Despite significant differences of opinions, the opinions of all the groups tended in the direction of positive values with regard to the needs of the various audio-visual materials.

Topic 9: Future Needs of Teaching Aids in the Various Areas of Agriculture

Findings: There were significant differences between the opinions of teachers and principals regarding the needs of audio-visual aids in teaching irrigation, marketing farm crops, analyzing production and marketing practices, and agriculture workshops. Principals rated the needs in these four areas higher than did the teachers. The greater amount of teaching experience probably influenced these opinions.

However, principals differed significantly among themselves regarding the needs for teaching aids in the area of seed and plant selection.

Those with a high school education rated the needs in this area higher than did those with a junior college or university education. With the exception of these areas of significant differences, the groups were in close accord regarding the needs of teaching aids in the areas of agriculture.

Conclusions: Both teachers and principals indicated that a very great

need for teaching aids exists in nearly all of the areas of agriculture. The ideas of both groups about what is most important and least important in regard to the areas of agriculture are virtually identical. For example, both teachers and principals indicated that the area with the greatest need of teaching aids is adult education and the areas with the least needs are metalwork and woodwork.

Recommendations

The following recommendations are formulated in accordance with the current literature in the field of audio-visual education and the needs of vocational agriculture teachers in Jordan as revealed in this study.

1. The in-service program should be expanded so that every teacher and principal will have the opportunity to learn basic audio-visual principles year round while they are on the job.
2. During summer vacations, audio-visual workshops should offer comprehensive training to teachers and principals from the various parts of the country.
3. In-service courses should include:
 - a. Evaluation and selection of audio-visual materials and equipment
 - b. Operation of audio-visual equipment
 - c. Utilization of audio-visual materials
 - d. Basic principles of photography and graphics art
 - e. Production of inexpensive materials
4. Each school should have a building coordinator to inform teachers of available materials, inform and assist them in

the use of materials and equipment, assist them in the production of materials, coordinate the use of equipment and materials in the school and community, and to assume the responsibility of the maintenance and care of equipment and materials. This person should have the basic knowledge of audio-visual education and administration.

5. The junior colleges should provide courses for student teachers, which include the various phases of audio-visual education to provide them with basic, practical knowledge.
6. Schools should have the recommended basic required equipment, materials, and facilities which are discussed in Chapter II of this study.
7. Teachers and principals should be granted time apart from their duties to enable them to participate in in-service training programs.
8. A periodic bulletin should be published to discuss helpful information and new advances in the field, to keep teachers and principals up to date.
9. Research is needed which would define the role of audio-visual with regard to the total educational system.
10. Future studies should be conducted to evaluate the program at later stages.

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APPENDIX A

Post Office Box 227
Stillwater, Oklahoma 74074
U.S.A.
October 1, 1965

The Honorable Minister of Education
Ministry of Education
Amman, Jordan

Dear Sir:

In regard to your letter dated July 11, 1965, number 14/39/16826, I am sending two separate parcels which contain 650 copies of my questionnaire.

Questionnaire Form I is to be distributed to all vocational agriculture teachers. Questionnaire Forms II and III are to be distributed to all principals of schools which have vocational agriculture departments.

No respondent or participating school will be identified in any manner whatsoever.

Due to the shortness of time, I am sending the parcels by air-mail. I will appreciate your distributing the questionnaire and returning only the completed forms by air-mail. I will reimburse the Ministry for any expenses incurred.

Thank you for your assistance.

Very truly yours,

Suleiman Daud Zalatio

APPENDIX B

TABLE XXIX

RESPONSES OF 170 TEACHERS AND 98 PRINCIPALS CONCERNING THE
NEEDS OF AUDIO-VISUAL EQUIPMENT, IN PERCENT

Equipment		Not Needed	Important but not Necessary	Necessary for the Progress of Education	Total
(a) 2 x 2 Slide Projector	T	3	14	83	100
	P	9	23	68	100
z-score -2.80**					
(b) 3 $\frac{1}{4}$ x 4 Slide Projector	T	7	19	74	100
	P	12	30	58	100
z-score -2.81**					
(c) Filmstrip Projector	T	7	19	74	100
	P	16	30	54	100
z-score -3.03**					
(d) Tape Recorder	T	17	35	48	100
	P	5	29	66	100
z-score 3.13**					

T teachers

P principals

**Significant at the one percent level by Mann-Whitney U test.

TABLE XXX

RESPONSES OF 170 TEACHERS BY FORMAL EDUCATION CONCERNING THE
NEEDS OF AUDIO-VISUAL EQUIPMENT, IN PERCENT

Equipment		Not Needed	Important but not Necessary	Necessary for the Progress of Education	Total
Television	T ^a	33	29	38	100
	T ^b	21	22	57	100
z-score 2.14*					

T^a 68 teachers with a high school diploma

T^b 102 teachers with a college degree

*Significant at the five percent level by Mann-Whitney U test.

TABLE XXXI

RESPONSES OF 98 PRINCIPALS BY FORMAL EDUCATION CONCERNING THE
NEEDS OF AUDIO-VISUAL EQUIPMENT, IN PERCENT

Equipment		Not Needed	Important but not Necessary	Necessary for the Progress of Education	Total
(a) Still Camera	P ^a	23	22	55	100
	P ^b	0	18	82	100
	z-score 2.91**				
(b) Television	P ^a	24	28	48	100
	P ^b	10	22	68	100
	z-score 2.02*				

P^a 65 principals with a high school diploma

P^b 33 principals with a college degree

*Significant at the five percent level by Mann-Whitney U test.

**Significant at the one percent level by Mann-Whitney U test.

TABLE XXXII

RESPONSES OF 170 TEACHERS AND 98 PRINCIPALS CONCERNING THE
NEEDS OF AUDIO-VISUAL MATERIALS, IN PERCENT

Materials		Not Needed	Important but not Necessary	Necessary for the Progress of Education	Total
(a) 2 x 2 Slides	T	4	16	80	100
	P	11	26	63	100
z-score -3.25**					
(b) 3 $\frac{1}{4}$ x 4 Slides	T	5	19	76	100
	P	11	31	58	100
z-score -2.88**					
(c) Filmstrips	T	5	14	81	100
	P	9	25	66	100
z-score -2.68**					
(d) Overhead Transparencies	T	8	27	65	100
	P	15	32	53	100
z-score -2.13*					

T teachers

P principals

*Significant at the five percent level by Mann-Whitney U test.

**Significant at the one percent level by Mann-Whitney U test.

TABLE XXXIII

RESPONSES OF 170 TEACHERS BY FORMAL EDUCATION CONCERNING THE
NEEDS OF AUDIO-VISUAL MATERIALS, IN PERCENT

Materials		Not Needed	Important but not Necessary	Necessary for the Progress of Education	Total
(a) 16 mm Educational Films	T ^a	6	9	85	100
	T ^b	0	6	94	100
z-score 2.03*					
(b) 2 x 2 Slides	T ^a	6	21	73	100
	T ^b	1	13	86	100
z-score 2.36*					

T^a 68 teachers with a high school diploma

T^b 102 teachers with a college degree

*Significant at the five percent level by Mann-Whitney U test.

TABLE XXXIV

RESPONSES OF 98 PRINCIPALS BY FORMAL EDUCATION CONCERNING THE
NEEDS OF AUDIO-VISUAL MATERIALS, IN PERCENT

Materials		Not Needed	Important but not Necessary	Necessary for the Progress of Education	Total
(a) 16 mm Educational Films	P ^a	3	17	80	100
	P ^b	3	0	97	100
z-score 2.19*					
(b) Filmstrips	P ^a	12	28	60	100
	P ^b	3	18	79	100
z-score 1.96*					

P^a 65 principals with a high school diploma

P^b 33 principals with a college degree

*Significant at the five percent level by Mann-Whitney U test.

TABLE XXXV

RESPONSES OF 89 TEACHERS BY SOURCE OF AUDIO-VISUAL EXPERIENCE
CONCERNING THE NEEDS OF AUDIO-VISUAL MATERIALS, IN PERCENT

Materials		Not Needed	Important but not Necessary	Necessary for the Progress of Education	Total
(a) 2 x 2 Slides	T ^a	4	20	76	100
	T ^b	0	3	97	100
z-score 2.54*					
(b) 3 $\frac{1}{4}$ x 4 Slides	T ^a	8	25	67	100
	T ^b	0	10	90	100
z-score 2.42*					
(c) Feltboards	T ^a	5	17	78	100
	T ^b	15	26	59	100
z-score -2.00*					
(d) Micro-films	T ^a	17	48	35	100
	T ^b	10	31	59	100
z-score 1.98*					

T^a 57 teachers whose source of audio-visual experience was formal and in-service

T^b 32 teachers whose source of audio-visual experience was hobbies

*Significant at the five percent level by Mann-Whitney U test.

TABLE XXXVI

RESPONSES OF 43 PRINCIPALS BY SOURCE OF AUDIO-VISUAL EXPERIENCE
CONCERNING THE NEEDS OF AUDIO-VISUAL MATERIALS, IN PERCENT

Materials		Not Needed	Important but not Necessary	Necessary for the Progress of Education	Total
(a) Feltboards	P ^a	0	9	91	100
	P ^b	5	30	65	100
z-score -2.05*					
(b) Electric Boards	P ^a	14	36	50	100
	P ^b	25	60	15	100
z-score -2.16*					

T^a 23 principals whose source of audio-visual experience was formal and in-service

T^b 20 principals whose source of audio-visual experience was hobbies

*Significant at the five percent level by Mann-Whitney U test.

TABLE XXXVII

RESPONSES OF 170 TEACHERS AND 98 PRINCIPALS CONCERNING THE NEEDS OF
TEACHING AIDS IN THE VARIOUS AREAS OF AGRICULTURE, IN PERCENT

Area of Agriculture		Little Need	Some Need	Great Need	Very Great Need	Total
(a) Irrigation	T	6	27	27	40	100
	P	2	17	26	55	100
z-score 2.71**						
(b) Marketing Farm Crops	T	7	9	31	53	100
	P	1	10	24	65	100
z-score 1.96*						
(c) Analyzing Production and Marketing Practices	T	6	16	34	44	100
	P	1	12	30	57	100
z-score 2.14*						
(d) Agricultural Workshops	T	19	32	29	20	100
	P	14	24	33	29	100
z-score 2.03*						

T teachers

P principals

*Significant at the five percent level by Mann-Whitney U test.

**Significant at the one percent level by Mann-Whitney U test.

TABLE XXXVIII

RESPONSES OF 98 PRINCIPALS BY FORMAL EDUCATION CONCERNING THE NEEDS OF
TEACHING AIDS IN THE VARIOUS AREAS OF AGRICULTURE, IN PERCENT

Area of Agriculture		Little Need	Some Need	Great Need	Very Great Need	Total
Seed and Plant Selection	P ^a	1	5	5	89	100
	P ^b	0	6	24	70	100
	z-score -2.23*					

P^a 65 principals with a high school diploma

P^b 33 principals with a college degree

*Significant at the five percent level by Mann-Whitney U test.

APPENDIX C

QUESTIONNAIRE FORM I

For Vocational Agriculture Teachers

Directions: Please indicate your response by marking a (✓) in the appropriate space. It is most important that every item be answered.

Part I.

1. Please check only one response to the item. If more than one response is applicable, check the one which best relates to your role in education.

- (a) Elementary Teacher (Grade 1-6) ()
- (b) Preparatory Teacher (Grade 7-9) ()
- (c) Secondary Teacher (Grade 10-12) ()
- (d) Junior College Teacher. ()
- (e) College & University Teacher. ()

2. What subject matter do you teach:

	Grade Level	Hours per week (Teaching Time)
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. Your age is: 10-19. () 40-49. ()
20-29. () 50-59. ()
30-39. () 60 or over ()

4. Teaching Experience:

_____ years in teaching
_____ years in administrative work
_____ years in other than these indicated

5. Highest Degree:

High School Diploma ()
 Junior College Diploma. ()
 B.S. or B.A. degree ()
 M.S. or M.A. degree ()
 Doctorate in Educ. or Ph.D. degree. . . ()

6. Name & Location of School: _____

7. Do you have any experience in Audio-Visual Education?

Yes () No ()

If yes, please indicate how you obtained this experience

8. Do you now participate in any Audio-Visual program?

Yes () No ()

If yes please indicate:

Name of program _____

Date of program _____

Number of hours _____

9. Please indicate below if you know how to operate the following equipment. Also indicate the average number of hours use per week.

	Yes	No	Number of hours (average use per week)
16 mm M.P. projector. . .	()	() ()
2 x 2 slide projector . .	()	() ()
3 $\frac{1}{4}$ x 4 slide projector. .	()	() ()
filmstrip projector . . .	()	() ()
overhead projector. . . .	()	() ()
opaque projector.	()	() ()
tape recorder	()	() ()
record player	()	() ()
public address system . .	()	() ()

	Yes	No	Number of hours (average use per week)
still camera.	()	()	()
movie camera.	()	()	()
photographic enlarger . .	()	()	()
duplicating machine . . .	()	()	()
television.	()	()	()
radio	()	()	()

10. Please indicate if you use any of the following materials in your teaching:

	Yes	No
16 mm films.	()	()
2 x 2 slides	()	()
3 $\frac{1}{4}$ x 4 slides.	()	()
filmstrips	()	()
transparencies	()	()
photographs.	()	()
charts & graphs.	()	()
maps	()	()
models & mockups	()	()
dioramas	()	()
silk screen.	()	()
feltboards	()	()
electric boards.	()	()
bulletin boards.	()	()
magnetic boards.	()	()
display & exhibits	()	()

Opinions and Future Needs

Part II.

In the columns below, please supply the following information:

- 1) Do you feel that the item is very important and necessary for the progress of education?
- 2) Do you feel it is important but not considered necessary?
- 3) Do you feel it is not needed at all?

1. <u>Equipment</u>	Necessary for the pro- gress of education	Important but not necessary	Not needed
16 mm M.P. proj.	()	()	()
2 x 2 slide proj.	()	()	()
3 $\frac{1}{4}$ x 4 slide proj.	()	()	()
filmstrip proj.	()	()	()
overhead proj.	()	()	()
opaque proj.	()	()	()
tape recorder	()	()	()
record player	()	()	()
public address system	()	()	()
still camera	()	()	()
movie camera	()	()	()
photographic enlarger	()	()	()
duplicating machine	()	()	()
television	()	()	()
radio	()	()	()
 2. <u>Materials</u>	 Necessary for the pro- gress of education	 Important but not necessary	 Not needed
16 mm films	()	()	()
2 x 2 slides	()	()	()

Materials	Necessary for the pro- gress of education	Important but not necessary	Not needed
3 $\frac{1}{4}$ x 4 slides	()	()	()
filmstrips	()	()	()
transparencies	()	()	()
photographs	()	()	()
posters	()	()	()
charts, graphs & maps	()	()	()
models	()	()	()
dioramas	()	()	()
mounting maps & graphs	()	()	()
silkscreen	()	()	()
feltboards	()	()	()
electric boards	()	()	()
magnetic boards	()	()	()
bulletin boards	()	()	()
displays & exhibits	()	()	()
micro-films	()	()	()
micro-slides	()	()	()

Part III.

Problem Areas in Agriculture

Below are listed broad areas of agriculture known as "problem areas." Please indicate the needs for teaching aids in each of these areas and rank in order of importance as to such needs.

Rank number 1 indicates highest importance.

Rank number 35 indicates least importance.

<u>EXAMPLE</u>	very great need	great need	some need	little need	rank
Controlling Plant Diseases	(X)	()	()	()	(1)
Bee Keeping	()	()	(X)	()	(23)
Harvesting Cotton	()	()	()	(X)	(35)

Problem Area in Agriculture	very great need	great need	some need	little need	rank
Helping Adult Farmers	()	()	()	()	()
Student Farmer Organization	()	()	()	()	()
Management in Agriculture	()	()	()	()	()
Farm Organizations	()	()	()	()	()
Livestock Selection	()	()	()	()	()
Poultry Selection	()	()	()	()	()
Feeding Livestock	()	()	()	()	()
Feeding Poultry	()	()	()	()	()
Breeding and Improving Herds & Flocks	()	()	()	()	()
Controlling Parasites in Animals	()	()	()	()	()
Controlling Animal Diseases	()	()	()	()	()
Bee Keeping	()	()	()	()	()
Seed and Plant Selection	()	()	()	()	()
Plant Propagation	()	()	()	()	()

Problem Area in Agriculture	very great need	great need	some need	little need	rank
Tillage Practices with Crops	()	()	()	()	()
Crop Rotation	()	()	()	()	()
Harvesting Crops	()	()	()	()	()
Controlling Insects	()	()	()	()	()
Controlling Plant Diseases	()	()	()	()	()
Fertilization	()	()	()	()	()
Irrigation	()	()	()	()	()
Pasture Management	()	()	()	()	()
Producing Vegetables	()	()	()	()	()
Producing Fruits	()	()	()	()	()
Dairy Production Management	()	()	()	()	()
Keeping and Interpreting Farm Records & Accounts	()	()	()	()	()
Marketing Livestock & Livestock Production	()	()	()	()	()
Marketing Dairy Products	()	()	()	()	()
Marketing Farm Crops	()	()	()	()	()
Analyzing Production & Marketing Practices	()	()	()	()	()
Selecting Farm Machinery	()	()	()	()	()
Agricultural Workshops	()	()	()	()	()
Metalwork	()	()	()	()	()
Woodwork	()	()	()	()	()
Water Conservation	()	()	()	()	()

QUESTIONNAIRE FORM II

For Principals of Schools Which Have a
Vocational Agriculture Department

Directions: Please indicate your response in the space provided. It is most important that every item be answered.

1. Name & Location of school _____

2. Number of students enrolled _____
3. Number of teachers _____
4. Please check number of sections of each grade
Elementary 1 (), 2 (), 3 (), 4 (), 5 (), 6 ()
Preparatory 7 (), 8 (), 9 ()
Secondary 10 (), 11 (), 12 ()
Junior College 1 (), 2 ()
College 1 (), 2 (), 3 (), 4 ()
5. Please indicate the item and quantity in your school.

	<u>Available</u>	<u>Quantity</u>	<u>Not Available</u>
16 mm M.P. projector. . . .	()	()	()
2 x 2 slide projector . . .	()	()	()
3 $\frac{1}{4}$ x 4 slide projector. . .	()	()	()
filmstrip projector	()	()	()
overhead projector.	()	()	()
opaque projector.	()	()	()
tape recorder	()	()	()
record player	()	()	()
public access system . . .	()	()	()

	<u>Available</u>	<u>Quantity</u>	<u>Not Available</u>
still camera.	()	()	()
movie camera.	()	()	()
photographic enlarger . . .	()	()	()
television receiver	()	()	()
radio	()	()	()
screen.	()	()	()
projection table.	()	()	()
duplicating machine	()	()	()
2 x 2 slides.	()	()	()
filmstrips.	()	()	()
motion picture films. . . .	()	()	()

6. Space Facilities

	<u>Yes</u>	<u>No</u>
Conference room	()	()
Display room.	()	()
Preview room.	()	()
Dark room for photography . .	()	()
Storage	()	()
Auditorium.	()	()

QUESTIONNAIRE FORM III

For Principals of Schools Which Have a
Vocational Agriculture Department

Directions: Please indicate your response by marking a (✓) in the appropriate space. It is most important that every item be answered.

Part I.

1. Title: _____

(a) Principal ()

(b) Others (Please Indicate). ()

2. What subject matter do you teach:

Subject	Grade level	Hours per week (Teaching time)
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. Your age is: _____ years.

4. Teaching experience:

_____ years in teaching

_____ years in administrative work

_____ years in other than these indicated

5. Highest degree:

High school diploma. ()

Junior college diploma ()

B.A. or B.S. degree. ()

M.A. or M.S. degree. ()

Ed.D. or Ph.D. degree. ()

Others _____ ()

6. Name and location of school:

7. Do you have any experience in Audio-Visual Education?

Yes. ()

No ()

If yes, please indicate how you obtained this experience

8. Do you now participate in any Audio-Visual Program?

Yes. ()

No ()

If yes, please indicate:

Name of program _____

Date of program _____

Number of hours _____

Opinions and Future Needs

Part II.

In the columns below, please supply the following information:

- 1) Do you feel that the item is very important and necessary for the progress of education?
- 2) Do you feel it is important but not considered necessary?
- 3) Do you feel it is not needed at all?

1. <u>Equipment</u>	Necessary for the pro- gress of education	Important but not necessary	Not needed
16 mm M.P. proj.	()	()	()
2 x 2 slide proj.	()	()	()
3 $\frac{1}{4}$ x 4 slide proj.	()	()	()
filmstrip proj.	()	()	()
overhead proj.	()	()	()
opaque proj.	()	()	()
tape recorder	()	()	()
record player	()	()	()
public address system	()	()	()
still camera	()	()	()
movie camera	()	()	()
photographic enlarger	()	()	()
duplicating machine	()	()	()
television	()	()	()
radio	()	()	()
2. <u>Materials</u>	Necessary for the pro- gress of education	Important but not necessary	Not needed
16 mm films	()	()	()
2 x 2 slides	()	()	()

Materials	Necessary for the progress of education	Important but not necessary	Not needed
3 $\frac{1}{4}$ x 4 slides	()	()	()
filmstrips	()	()	()
transparencies	()	()	()
photographs	()	()	()
posters	()	()	()
charts, graphs & maps	()	()	()
models	()	()	()
dioramas	()	()	()
mounting maps & graphs	()	()	()
silkscreen	()	()	()
feltboards	()	()	()
electric boards	()	()	()
magnetic boards	()	()	()
bulletin boards	()	()	()
displays & exhibits	()	()	()
micro-films	()	()	()
micro-slides	()	()	()

Part III.

Problem Areas in Agriculture

Below are listed broad areas of agriculture known as "problem areas." Please indicate the needs for teaching aids in each of these areas and rank in order of importance as to such needs.

Rank number 1 indicates highest importance.

Rank number 35 indicates least importance.

<u>EXAMPLE</u>	very great need	great need	some need	little need	rank
Controlling Plant Diseases	(X)	()	()	()	(1)
Bee Keeping	()	()	(X)	()	(23)
Harvesting Cotton	()	()	()	(X)	(35)

Problem Area in Agriculture	very great need	great need	some need	little need	rank
Helping Adult Farmers	()	()	()	()	()
Student Farmer Organization	()	()	()	()	()
Management in Agriculture	()	()	()	()	()
Farm Organizations	()	()	()	()	()
Livestock Selection	()	()	()	()	()
Poultry Selection	()	()	()	()	()
Feeding Livestock	()	()	()	()	()
Feeding Poultry	()	()	()	()	()
Breeding and Improving Herds & Flocks	()	()	()	()	()
Controlling Parasites in Animals	()	()	()	()	()
Controlling Animal Diseases	()	()	()	()	()
Bee Keeping	()	()	()	()	()
Seed and Plant Selection	()	()	()	()	()
Plant Propagation	()	()	()	()	()

Problem Area in Agriculture	very great need	great need	some need	little need	rank
Tillage Practices with Crops	()	()	()	()	()
Crop Rotation	()	()	()	()	()
Harvesting Crops	()	()	()	()	()
Controlling Insects	()	()	()	()	()
Controlling Plant Diseases	()	()	()	()	()
Fertilization	()	()	()	()	()
Irrigation	()	()	()	()	()
Pasture Management	()	()	()	()	()
Producing Vegetables	()	()	()	()	()
Producing Fruits	()	()	()	()	()
Dairy Production Management	()	()	()	()	()
Keeping and Interpreting Farm Records & Accounts	()	()	()	()	()
Marketing Livestock & Livestock Production	()	()	()	()	()
Marketing Dairy Products	()	()	()	()	()
Marketing Farm Crops	()	()	()	()	()
Analyzing Production & Marketing Practices	()	()	()	()	()
Selecting Farm Machinery	()	()	()	()	()
Agricultural Workshops	()	()	()	()	()
Metalwork	()	()	()	()	()
Woodwork	()	()	()	()	()
Water Conservation	()	()	()	()	()

APPENDIX D

AN OVERVIEW OF THE LAND AND PEOPLE OF JORDAN

Introduction

Many civilizations have flourished and died in the area that is now known as Jordan. From the Canaanites to the Crusaders, the country received cultural as well as physical contributions. Jordan is looked upon as the birthplace of three major religions and is considered to contain the most significant historical religious sites in the world.

Since the seventh century Jordan has been a predominately Arab country and has been under Arab rule except for the period from 1099-1187 when the Crusaders occupied the area and the four-hundred year period prior to World War I, when Jordan was part of the Ottoman Empire. In 1920, a British mandate provided for the formation of the Trans-Jordan Amirate, which was composed of the districts of Ajlun, Amman, Balqa, and Karak. The districts of Ma'an and Aqaba were annexed to Trans-Jordan in 1925. Trans-Jordan became a sovereign state in 1946. At the end of the Palestine war in 1950, Central Arab Palestine and Trans-Jordan were united to form the Hashemite Kingdom of Jordan.¹

Jordan covers an area of approximately 37,737 square miles, of which some 2,917 square miles constitute the water area of the Dead Sea.

¹Jordan Tourist Department, A Guide to Jordan, the Holy Land (Amman, 1959), pp. 5-6.

Of the land area, 32,639 square miles lie on the east bank of the Jordan River, the Dead Sea, and the Wadi Araba and 2,181 square miles lie on the west bank. The east bank is bounded on the north by the Syrian Arab Republic, on the east by Iraq and Saudi Arabia, on the south by Saudi Arabia, and on the southwest and west by occupied Palestine.²

The Land of Jordan

Geographic Regions³

Jordan can be divided into four regions on the basis of climatic and topographic factors which determine the distribution of population by imposing agricultural patterns. These regions include the desert, the east bank uplands, the west bank uplands, and the Jordan River-Dead Sea-Wadi Araba depression.

The desert, which is part of the Syrian or North Arabian Desert, makes up the eastern and southern four-fifths of the east bank. It has a short, cold, winter season and a long summer season characterized by hot days and cool nights. The slight winter rainfall averages less than 50 millimeters annually. Limited grazing is possible during the winter months.

The plains country which leads to the uplands and the escarpment overlooking the Jordan River and the Dead Sea rises west of the desert. As the altitude increases, so does the rainfall, reaching 200 to 500 millimeters annually in the northern uplands, which extend roughly from

²Department of Statistics, First Census of Population and Housing, Volume 3 (August, 1964), Amman, p. vii.

³Ibid.

south of Amman to the Syrian border. In addition to raising livestock, the people of the plains area cultivate grains. Because of the greater rainfall in the northern uplands many fruits and vegetables are grown.

The climate and seasons of the west bank uplands are similar to those of the east bank except that the rainfall is heavier and averages more than 600 millimeters in the north. Fruits, vegetables, and grains are grown and much of the land is utilized for olive groves. The major towns including Jenin, Nablus, Ramallah, Jerusalem, Bethelhem, and Hebron lie in an almost straight line through the middle of this region. The uplands extend to the borders of occupied Palestine in the south and west; in the north they slope gradually towards the plains of Galilee. In the eastern section the uplands fall abruptly towards the Jordan Valley and the Dead Sea. This area provides a rugged landscape cut by deep valleys. Cultivation is limited, since the rainfall decreases with the altitude, and, except in small areas fed by springs and streams, the land is used only for grazing.

The Jordan River-Dead Sea-Wadi Araba depression presents a marked physical contrast to the surrounding regions. Here are long, hot, dry summers and short, warm, and relatively dry winters. Cultivation is possible in the valley by using the waters of the Jordan for irrigation. Wells and streams provide a means of irrigation on the eastern rim of the valley. The East Ghor Canal project which now diverts the waters of the Yarmuk River now provides a basis of cultivation in the north. The western rim of the valley is largely unsuitable for cultivation.

The People of Jordan

Distribution⁴

The distribution of population is determined primarily by the pattern of rainfall and cultivation. The total population of Jordan is 1,706,226. Of these almost seven-eighths live in the northwest corner of the country, an area about one-eighth of the total land area. The 1961 census shows the following distribution of people in the eight districts of the country: Amman District, 433,618; Balqa District, 79,057; Ajlun District, 273,976; Karak District, 67,211; Ma'an District, 46,914; Hebron District, 119,432; Jerusalem District, 344,270; and Nablus District, 341,748.⁵

Mode of Living

There are three general modes of life in Jordan: the urban, the rural, and the nomadic. The urban population is found in cities and towns while the rural population is found in villages in the areas where rainfall or irrigation can support agriculture. The nomads live primarily in the desert and the steppe-country leading to the uplands. Village life merges with the nomadic way of life among the semi-nomads and features of both rural and urban life are blended in the smaller towns.

⁴Department of Statistics, First Census of Population and Housing, Volume 3 (Amman, 1964), p. viii.

⁵Department of Statistics, First Census of Population and Housing, Volume 3 (Amman, 1964), p. xx.

Nomads and Semi-Nomads

There are two types of nomad in Jordan: the Bedouins, or eastern nomads, live in the uplands and plains of the east bank during the summer and move their animals into the eastern desert and the Wadi Araba during the winter rains. The bedouins are traditionally camel-nomads but the camel has declined in importance in modern Jordan. The western nomads raise sheep and goats. They spend the summers in the uplands of both the east and west banks and the winters in the Jordan and Dead Sea valleys. Today there are relatively few true nomads, those who are entirely wanderers. The larger number (about 50,000) are semi-nomads who plant fields which they leave during the winter and return to harvest in the spring. Some of these still live in the goat-hair tents all year round; others have houses in the villages and live in the tents only during the winter migration. The wandering is decreasing as the need to remain near their crops and near the expanding school system increases.

The Rural Population

Most of the rural people live in villages and go out from them to tend their fields in the surrounding area. East bank villages average about 400 inhabitants; the average size of the west bank village is 800. They are almost totally dependent on agriculture. Except for the homes of the farmers, most of the villages have only a mosque (or, in the few Christian villages, a church), a general store, an elementary school, a medical dispensary, and a postal branch. The village people are bound to each other by strong ties of kinship and tradition. The people are becoming more organized as the radio, schools, and better travel con-

ditions bring them into contact with other segments of the country.

The Urban Population

The urban areas are quite different from the rural areas. In the cities and towns are the seats of government; the centers of commerce, finance, manufacturing, and communications; hospitals; institutions of higher education; and amusement centers. Therefore, most of the urban population is employed in occupations which are associated with these institutions. The larger towns, such as Amman and Jerusalem, are completely urban, although some of the smaller towns have a large minority of people who are engaged in farming.

Refugee Camps

There is one segment of the population of Jordan which does not fit under the categories described above. These are the refugees from occupied Palestine who live in UNRWA camps. Some of these camps which are located in or near large towns are basically part of the urban population of the country. Others, which are located in rather remote areas, fit into neither the rural nor the urban pattern as previously described.

VITA

Suleiman Daud Zalatimo

Candidate for the Degree of

Doctor of Education

Thesis: A STUDY OF THE AVAILABILITY, UTILIZATION, AND PROJECTED NEEDS OF AUDIO-VISUAL AIDS FOR VOCATIONAL AGRICULTURE TEACHERS IN THE PUBLIC SCHOOLS OF JORDAN

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Jerusalem, Palestine, August 30, 1930, the son of Dawud I. and Wedad A. Zalatimo.

Education: Attended elementary school in Lydda, Palestine and Rashedia High School in Jerusalem, Jordan; graduated from Kadoorie Agricultural School in 1953; attended Syracuse University, Syracuse, New York with a scholarship granted by the USOM/Jordan and the Ministry of Education; received the Bachelor of Science degree from Oklahoma State University, with a major in Agricultural Education, in August, 1958; received the Master of Science degree from Indiana University, with a major in Audio-Visual Education, in August, 1959; received the Specialist in Education degree from Indiana University, with a major in Audio-Visual Communications, in June, 1961. Requirements for the Doctor of Education degree were completed at Oklahoma State University in May, 1967.

Professional experience: Entered the teaching profession as a vocational agriculture and science teacher at Rural Teachers Training College in Jerusalem in 1953; was transferred to the Audio-Visual Center, USOM/Jordan, in 1955, at the request of the Ministry of Education; after returning from a year's study at Syracuse University, taught agriculture and workshop at Rural Teachers Training College and Mens Teachers College until 1957; joined the staff of the Audio-Visual Department of Southern Illinois University, Carbondale, Illinois, as lecturer and Head of Graphic Arts in 1961.

installation and testing of new equipment should be done by the dealer and training in its operation and care should be provided to all who will use the item.²⁶

The Indiana State Department of Education recommended the following equipment standards in a report published in 1956:²⁷ a record player and radio should be provided for every 100 pupils; a 16 mm sound motion picture projector, a tape recorder, a combination filmstrip and 2-inch slide projector, and a 7-inch by 7-inch overhead transparency projector should be provided for every 300 students; an opaque projector and a 3 $\frac{1}{4}$ -inch by 4-inch lantern slide projector should be provided for every 600 pupils. Every school building should have at least one of the above equipment units, as well as a portable public address system, movable equipment stands for each piece of heavy equipment, and sufficient screens to meet the needs of the teachers. In 1944, the American Council on Education stated minimum goals for supplying equipment. These include: a wall-type screen in each classroom; an opaque projector and a public address system in each building and one of the following equipment units: a 16 mm sound motion picture projector, a record player, and a filmstrip projector for every 200 students; and a 3 $\frac{1}{4}$ by 4-inch lantern slide projector for every 400 pupils.²⁸

²⁶James W. Brown and Kenneth D. Norberg, Administering Educational Media (New York, 1965), pp. 104-5.

²⁷The Audio-Visual Program, State of Indiana, Department of Education (Indianapolis, 1956), pp. 120-1.

²⁸Carlton W. H. Erickson, Administering Audio-Visual Services (New York, 1959), pp. 342-43.