1968

The Effectiveness of Selected Educational Media in Disseminating Knowledge of the Care and Prevention of Injuries to Insensitive Feet to Diabetics of Different Educational Levels.

Stephen Edward Klesius
Louisiana State University and Agricultural & Mechanical College

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THE EFFECTIVENESS OF SELECTED EDUCATIONAL MEDIA IN DISSEMINATING KNOWLEDGE OF THE CARE AND PREVENTION OF INJURIES TO INSENSITIVE FEET TO DIABETICS OF DIFFERENT EDUCATIONAL LEVELS.

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DISSEMINATING KNOWLEDGE OF THE CARE AND
PREVENTION OF INJURIES TO INSENSITIVE
FEET TO DIABETICS OF DIFFERENT
EDUCATIONAL LEVELS

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Health, Physical, and Recreation Education

by

Stephen Edward Klesius
B. S., Florida State University, 1962
M. S., Florida State University, 1966
August, 1968
Dedicated to my wife,

Janell
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# TABLE OF CONTENTS

| ACKNOWLEDGEMENTS                           | ii   |
| LIST OF TABLES                            | vi   |
| ABSTRACT                                  | viii  |

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>3</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>3</td>
</tr>
<tr>
<td>Significance</td>
<td>4</td>
</tr>
<tr>
<td>Delimitations of the Study</td>
<td>6</td>
</tr>
<tr>
<td>Limitations of the Study</td>
<td>7</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>7</td>
</tr>
<tr>
<td>II. REVIEW OF LITERATURE</td>
<td>9</td>
</tr>
<tr>
<td>Studies Related to the Effectiveness of</td>
<td></td>
</tr>
<tr>
<td>Motion Picture Films as Compared to</td>
<td></td>
</tr>
<tr>
<td>Textual Materials</td>
<td>9</td>
</tr>
<tr>
<td>Studies Related to the Comparative Effectiveness of Different Audio-Visual Media</td>
<td>12</td>
</tr>
<tr>
<td>Studies Related to the Comparative Effectiveness of Textual Materials, Films, and Filmstrips</td>
<td>16</td>
</tr>
<tr>
<td>III. PROCEDURE OF THE STUDY</td>
<td>18</td>
</tr>
</tbody>
</table>

iii
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview</td>
<td>18</td>
</tr>
<tr>
<td>Educational Media</td>
<td>19</td>
</tr>
<tr>
<td>Development of the Achievement Test</td>
<td>20</td>
</tr>
<tr>
<td>Subjects</td>
<td>23</td>
</tr>
<tr>
<td>Group Treatments and Classifications</td>
<td>25</td>
</tr>
<tr>
<td>Procedure for the Administration of the Achievement Test and Educational Presentation</td>
<td>27</td>
</tr>
<tr>
<td>Pilot Study</td>
<td>30</td>
</tr>
<tr>
<td>Statistical Analysis</td>
<td>32</td>
</tr>
<tr>
<td>IV. ANALYSIS OF DATA</td>
<td>33</td>
</tr>
<tr>
<td>Introduction</td>
<td>33</td>
</tr>
<tr>
<td>The Significance of the Mean Gains of the Nine Groups in Knowledge</td>
<td>33</td>
</tr>
<tr>
<td>Three by Three Factorial Analysis of Variance with Planned Orthogonal Comparisons</td>
<td>41</td>
</tr>
<tr>
<td>V. SUMMARY, FINDINGS, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY</td>
<td>53</td>
</tr>
<tr>
<td>Summary</td>
<td>53</td>
</tr>
<tr>
<td>Findings</td>
<td>55</td>
</tr>
<tr>
<td>Discussion</td>
<td>56</td>
</tr>
<tr>
<td>Conclusions</td>
<td>61</td>
</tr>
<tr>
<td>Recommendations for Further Study</td>
<td>61</td>
</tr>
<tr>
<td>SECTION</td>
<td>PAGE</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>SELECTED BIBLIOGRAPHY</td>
<td>63</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>68</td>
</tr>
<tr>
<td>A. Multiple-Choice Achievement Test</td>
<td>69</td>
</tr>
<tr>
<td>B. Outline of the Procedure of this Study</td>
<td>97</td>
</tr>
<tr>
<td>C. Instructions Given to the Subjects</td>
<td>98</td>
</tr>
<tr>
<td>D. Instructions Given to the Proctors</td>
<td>104</td>
</tr>
<tr>
<td>E. Age and Achievement Test Scores for the Subjects Used in This Study</td>
<td>105</td>
</tr>
<tr>
<td>VITA</td>
<td>112</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Significance of Mean Gains in Knowledge for 15 College Students Used in the Pilot Study</td>
<td>31</td>
</tr>
<tr>
<td>II. Significance of Mean Gains in Knowledge for 15 High Educational Level, Adult Diabetics Who Read the Booklet</td>
<td>34</td>
</tr>
<tr>
<td>III. Significance of Mean Gains in Knowledge for 15 High Educational Level, Adult Diabetics Who Saw the Film</td>
<td>35</td>
</tr>
<tr>
<td>IV. Significance of Mean Gains in Knowledge for 15 High Educational Level, Adult Diabetics Who Saw the Filmstrip</td>
<td>36</td>
</tr>
<tr>
<td>V. Significance of Mean Gains in Knowledge for 15 Medium Educational Level, Adult Diabetics Who Read the Booklet</td>
<td>36</td>
</tr>
<tr>
<td>VI. Significance of Mean Gains in Knowledge for 15 Medium Educational Level, Adult Diabetics Who Saw the Film</td>
<td>37</td>
</tr>
<tr>
<td>VII. Significance of Mean Gains in Knowledge for 15 Medium Educational Level, Adult Diabetics Who Saw the Filmstrip</td>
<td>38</td>
</tr>
</tbody>
</table>
LIST OF TABLES (continued)

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIII. Significance of Mean Gains in Knowledge for 15 Low Educational Level, Adult Diabetics Who Read the Booklet</td>
<td>38</td>
</tr>
<tr>
<td>IX. Significance of Mean Gains in Knowledge for 15 Low Educational Level, Adult Diabetics Who Saw the Film</td>
<td>39</td>
</tr>
<tr>
<td>X. Significance of Mean Gains in Knowledge for 15 Low Educational Level, Adult Diabetics Who Saw the Filmstrip</td>
<td>40</td>
</tr>
<tr>
<td>XI. Analysis of Variance of Gains in Knowledge of 135 Adult Diabetics of Three Educational Levels Who Were Presented Three Educational Media</td>
<td>43</td>
</tr>
<tr>
<td>XII. Comparison of Differences Among Gains in Knowledge of 135 Adult Diabetics as a Result of the Educational Media</td>
<td>45</td>
</tr>
<tr>
<td>XIII. Comparison of Differences Among Gains in Knowledge of 135 Adult Diabetics Classified According to Educational Level</td>
<td>47</td>
</tr>
<tr>
<td>XIV. Comparison of Differences of the Interaction Effects Among Three Educational Media and Three Educational Levels for 135 Adult Diabetics</td>
<td>51</td>
</tr>
</tbody>
</table>
ABSTRACT

The purpose of this study was to determine the effectiveness of a booklet, a film, and a filmstrip in disseminating knowledge of the care and prevention of injuries to insensitive feet to adult diabetics classified according to high, medium, and low educational levels. The subjects (N=135) were placed in one of nine groups on the basis of the educational media they were randomly presented and according to the highest grade level in school which they had completed.

The educational program consisted of two consecutive presentations of one of the educational media in a twenty-six minute period. Prior to and succeeding the educational presentation the subjects were administered a multiple-choice achievement test to determine their knowledge of the care and prevention of injuries to insensitive feet.

The statistical analysis of the data collected consisted of three-part analysis of variance to determine the significance of the mean gains in knowledge for each of the nine groups used in this study. A three by three factorial analysis of variance employing planned orthogonal comparisons was computed. This statistical design allowed investigation of the differences among the educational media in disseminating knowledge, the differences among the effectiveness of
the educational presentation with the educational levels,
and the interaction effects of the use of the educational
media with subjects of different educational levels.

The findings of this study were as follows:
1. Each of the nine groups, with the exception of the film-
strip presented to the medium education level group, made
significant gains in knowledge of the care and prevention of
injuries to insensitive feet at or beyond the .05 level of
confidence.
2. When the education media were compared without regard to
educational level, no significant differences were found
among the booklet, film, and filmstrip as to their effective-
ness in disseminating knowledge.
3. When the effectiveness of the educational presentation
was compared according to educational level, it was revealed
that the high educational level subjects made significantly
greater gains in knowledge at the .01 level of confidence,
than either the medium and low educational level subjects.
Secondly, it was found that the medium educational level sub-
jects made significantly greater gains, at the .05 level of
confidence, than the low educational level subjects.
4. The interaction effects were, in general, found to be
nonsignificant which indicated uniformity of the effects of
the educational media in the presence of the educational
levels. However, one interaction effect was found to be sig-
nificant at the .01 level of confidence. This comparison
revealed that the film was more effective with medium educational level subjects than was the filmstrip, but the filmstrip was more effective than the film with low educational level subjects.

Within the limits of this study the following conclusions were justified:

1. The booklet, film, and filmstrip are equally effective in disseminating knowledge of the care and prevention of injuries to insensitive feet.

2. The educational media are more effective the higher the educational level of the learner.

3. When the learners are classified according to educational level the booklet, film, and filmstrip are, in general, equally effective. An exception to this possibly exists for low educational level learners; in this case, the most effective audio-visual medium appears to be the filmstrip.
CHAPTER I
INTRODUCTION

Research problems in education originate from two main sources. First, there are those questions of a basic nature which have been unresolved by previous research. The second source includes those problems arising from educational methodology and the implementation of research in the teaching-learning process.\(^1\) This study was directed toward the latter category of research problems: the effectiveness of educational media in producing observable changes in behavior from which it can be inferred that learning has occurred.

The evaluation of educational media is important. Knowing those media which effectively contribute to desired educational outcomes is one of the first steps in improving the efficiency of any course of study.\(^2\) Schneider\(^3\) stated that the value of any educational medium can be determined


by its need and its effectiveness in enriching instruction. May and Lumsdaine\textsuperscript{4} cited another reason for evaluating instructional media and methods. They pointed out that if the educator is cognizant of the debility of a particular educational medium, plans can be made to make up this weakness in other ways. This could be accomplished by emphasizing these points in lectures and demonstrations or by improving the educational medium.

Research concerning the effectiveness of educational media has received varied attention. Cronbach\textsuperscript{5} stated that previous research on the effectiveness of textual materials has been limited, sketchy, and inconclusive. Conversely, the research on the use of audio-visual media has, in general, demonstrated the effectiveness of this method of instruction.

Schramm,\textsuperscript{6} Allen,\textsuperscript{7} Wittich,\textsuperscript{8} and Meirhenry\textsuperscript{9} agreed that research is needed to determine which educational media

\textsuperscript{4}May and Lumsdaine, \emph{Op. cit.}, p. 265.
can most effectively present a specific skill or subject. They also stated that the absence of research on the relative strength of educational media handicaps the development and implementation of effective educational media in the teaching-learning process.

I. STATEMENT OF THE PROBLEM

This study attempted to increase the present state of the knowledge concerning the following questions: What is the effectiveness of different educational media in disseminating health education material to learners of divergent educational levels? Do the subjects of one educational level make greater gains in knowledge than do the subjects of the other educational levels? Are there any unique differences in the effects of the three selected educational media with subjects of the three different educational levels?

II. PURPOSE OF THE STUDY

The purpose of this study was to determine the individual and comparative effectiveness of different educational media in disseminating the same health education material. More specifically, this study was designed to evaluate three educational media, a cartoon booklet, a film, and a filmstrip, relative to their effectiveness in disseminating knowledge of the care and prevention of injuries to
insensitive feet to diabetics classified according to high, medium, and low educational levels.

III. SIGNIFICANCE

People with diabetes and leprosy suffer a similar disability involving a loss of sensitivity in the extremities. In the case of either malady there exists a great need for education in the prevention of ulcers, infection, and deformities, especially in regard to the feet. Educational programs are needed which can effectively convey the importance of frequent examination of the feet, early and regular treatment of lesions, wearing properly fitted shoes and socks, and following those precautions that can aid in prevention of disability or deformity. In fact, educational programs for diabetics, of which there are three million known cases in the United States of America, and lepers, who number at least 181,000 in the Americas, to prevent deformity of the feet are as an important part of their


rehabilitation as is medical treatment. Rehabilitation for these people means that they may return to their proper place in the home, community, and society.

The Scientific Meeting on Rehabilitation in Leprosy stated that programs of prevention and rehabilitation must be produced simultaneously. It was also cited that an inseparable part of the total program of rehabilitation is education in the prevention of deformity. In addition, the World Health Organization placed priority emphasis on the development of educational media which can be used in the field to effectively aid in the prevention of disability. The need for these media in the patient education of diabetics has also been noted.

IV. DELIMITATIONS OF THE STUDY

This study was delimited to the use of adult diabetic patients (N=135) from Louisiana and Texas. Diabetic

16 Personal Interview with Paul Brand, M. D., Chief, Rehabilitation Branch, United States Public Health Service Hospital, Carville, Louisiana, December 14, 1967; Personal Interview with Harold Dobson, M. D., Diabetic Clinic, Ben Taub, General Hospital, Houston, Texas, June 6, 1968.
patients were used in order to allow a greater number of subjects to be tested than would have been possible if persons having leprosy were used. Diabetics suffer from insensitivity of the feet, but unlike leprosy patients are not shy or uncooperative about being identified as having this disabling condition. Therefore, it was believed that a larger number of people having insensitive feet or, at least, the proclivity toward this condition would be receptive to participating in a study in order to help themselves and, ultimately, other people with insensitive feet.

Secondly, this study was delimited to the acquisition of the specific information as presented by the educational media concerning the care and prevention of injuries to insensitive feet. No attempt was made to evaluate the effectiveness of the selected media in terms of application, as evidenced by a reduction in the frequency of visitations to outpatient clinics or doctor's offices. Likewise, this study was not concerned with the retention of learning.

V. LIMITATIONS OF THE STUDY

The measurement of the subjects' knowledge of the care and prevention of injuries to insensitive feet was limited specifically to the results of the test used in this study.

Complete control of the subjects' motivation in studying the information presented was not possible. However, it was assumed that since the subjects regularly
attended educational meetings or medical clinics that they were motivated.

The third limitation of this study was variations in the facilities used for testing and presenting the educational media among the groups. While all subjects completed the procedure of this study under similar conditions, differences could have existed which may have exerted an influence on the subjects' performances.

VI. DEFINITION OF TERMS

The terms basic to this study were listed and defined as follows:

Insensitive.--Not being able to feel pain.

Cartoon booklet or booklet.--Reference is directed solely to the cartoon booklet, The Care and Prevention of Injuries to Insensitive Feet, used in this study.

Motion picture film or film.--These terms are used to refer to the 16 millimeter color motion picture film with self-contained sound track entitled The Sensible Seven.

Filmstrip.--Reference is made to the filmstrip used in this study, The Care and Prevention of Injuries to Insensitive Feet.

Audio-visual media.--In this study this term is used to indicate media which utilize both auditory and visual presentation of the material to be learned. This includes the

**Effectiveness.**—Refers to gains in knowledge as represented by performance on an achievement test.

**High educational level.**—This term is used in this study to indicate subjects who had completed ten or more grades in school.

**Medium educational level.**—In this study this term is used to refer to subjects who had completed at least the seventh grade but not more than the ninth grade in school.

**Low educational level.**—Reference is directed to subjects who had completed six or less grades in school.
CHAPTER II

REVIEW OF LITERATURE

The review of literature presented in this chapter was given under three main headings. These headings were as follows: (1) Studies Related to the Effectiveness of Motion Picture Films as Compared to Textual Materials; (2) Studies Related to the Effectiveness of Different Audio-Visual Media; and (3) Studies Related to the Comparative Effectiveness of Text Materials, Films, and Filmstrips.

I. STUDIES RELATED TO THE EFFECTIVENESS OF MOTION PICTURE FILMS AS COMPARED TO TEXTUAL MATERIALS

In 1927, James\(^1\) studied the effectiveness of instruction by motion picture film versus a reading selection, made up of the subtitles from the film. Each method of presentation was limited to fourteen minutes and was tested by means of a completion test and a "yes-no" test. Instruction by the motion picture film was found to be more effective than instruction by the reading selection.

Hanson\textsuperscript{2} used matched pairs of seventh through twelfth grade pupils (N=164) to determine the effect of educational motion pictures upon learning. The pupils were matched on the basis of mental age and initial test scores and were shown a motion picture film or directed to read a 2,000 word exposition taken from the film. Both media were comparable in content and time allowed for completion. The conclusions of this study were that the motion picture film was an aid to learning and retaining the material presented. Secondly, the motion picture film was shown to produce results superior to those of the reading method.

Eichel\textsuperscript{3} in an experiment using sixth grade pupils (N=144) found that a sound film was more effective than a reading selection in teaching current history. Both the film and the reading selection, a special news leaflet, covered the same subject matter.

Wright\textsuperscript{4} used equated films and reading study materials to compare the effectiveness of these media in disseminating occupational information. This study used high school pupils.

\textsuperscript{2}John Elmore Hanson, "The Effectiveness of Educational Motion Pictures Upon Retention of Informational learning," \textit{Journal of Experimental Education}, II (September, 1933), 1-4.

\textsuperscript{3}Charles G. Eichel, "Experiment to Determine the Most Effective Method of Teaching Current History," \textit{Journal of Experimental Education}, IX (September, 1940), 37-40.

(N=389) divided equally between two groups. Using a rotational design and two different vocational topics, it was concluded that the printed materials were statistically superior to the motion pictures at the .01 level of confidence.

Hall and Cushing\(^5\) in a study of the relative value of three methods of presenting learning material found no significant difference among a film, illustrated written text, and verbal presentation in terms of acquisition and retention. A rotational design using adult subjects (N=300) and three different types of subject matter, informational, theoretical, and performance, were employed in this study.

Richardson and Smith\(^6\) investigated the effectiveness of movies versus reading in teaching health education material. Junior high school subjects (N=237) were equated on the basis of intelligence quotient and reading ability. The film lasted twelve minutes while the reading time of the written text was thirty minutes. The general conclusion of this study was that a good film was a more effective teaching aid than printed material. This was supported by the findings that the film group showed higher levels of learning and retention than the reading group. Also, of especial interest to this study, those subjects with limited reading ability

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or low intelligence quotients benefited more from viewing the film than reading the written selection.

In summary, the studies reviewed which related to the effectiveness of films as compared to textual materials indicated the superiority of motion pictures as a teaching medium. Four studies demonstrated that motion picture films were more effective in disseminating knowledge than were reading selections. One study reported no significant difference between the two educational media and another found that textual materials produced better results than a film. Thus, films appear to be more effective in disseminating knowledge than textual materials.

II. STUDIES RELATED TO THE COMPARATIVE EFFECTIVENESS OF DIFFERENT AUDIO-VISUAL MEDIA

Goodman\(^7\) investigated the effectiveness of four pictorial teaching media. The purpose of the study was to determine the degree pictorial aids influence learning. Using a rotational group design the subjects (N=144) were shown four educational programs. The presentational media were: a silent motion picture, sound motion picture, silent film slide, and sound film slide. Prior to and succeeding the educational presentations the subjects' knowledge of the

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topic was tested. Analysis of the data revealed that all four media were effective, the silent filmstrip produced the highest gain, and both sound media produced equal gains.

Hovland, Lumsdaine, and Sheffield undertook an investigation of the relative effectiveness of alternative media of presenting Army training material. The purpose of this study was to determine whether films, which are time consuming and expensive to produce, are as effective as a filmstrip, which can be quickly and inexpensively produced. Three equated groups of Army trainees (N=759) were used as subjects in this investigation. Both educational programs simulated military training conditions and were judged to be comparable although the filmstrip lasted fifty minutes while the film lasted only forty-three minutes. Since none of the subjects had any previous experience in the topic to be presented, map reading, only a terminal test was used to evaluate post-treatment achievement. Analysis of the data collected showed that either method of instruction was superior to no instruction. Furthermore, the magnitude of the critical ratio for the comparison between the film and filmstrip was found to be nonsignificant. When the data were analyzed with and without regard to intelligence level these

same results were demonstrated. The general conclusion of
the study was that both the film and the filmstrip were
equally effective.

Sampson\(^9\) compared the use of a film, filmstrip, and
field trip to a lecture method of instruction. Using simi-
lar groups of junior high school pupils (N=50) it was demon-
strated that all the sensory aids were superior to the lec-
ture. Secondly, it was demonstrated that the motion picture
was most effective, followed by the filmstrip, and the field
trip was found to be the least effective of the sensory media.

Laner\(^10\) studied the effectiveness of a motion picture
film and filmstrip in teaching males (N=75) how to perform a
manual task. This task was to dismantle, repair, and re-
assemble a sash-cord window. The analysis of the data col-
lected in this study revealed that both media were effective
and that there was no significant difference between media.

McBeath\(^11\) investigated the comparative effectiveness
of a captioned filmstrip, a captioned filmstrip with

\(^9\)James H. Sampson, "Effectiveness of Audio-Visual
Aids for Teaching Science," (Unpublished Master's Thesis,
University of Wyoming, 1953).

\(^10\)S. Laner, "The Impact of Visual Aid Displays
Showing a Manipulative Task," The Quarterly Journal of Ex-
perimental Psychology, VI (August, 1954), 95-106.

\(^11\)Ronald James McBeath, "A Comparative Study on the
Effectiveness of the Filmstrip, Sound Filmstrip, and Filmo-
graph for Teaching Facts and Concepts" (Unpublished Doctoral
Dissertation, University of Southern California, 1961).
(Microfilm.)
narration, a sound filmstrip, and a filmograph in teaching facts and concepts. A filmograph is a motion picture film which is made by using still pictures and moving the camera and employing other special photographic techniques. The subjects (N=558) were placed in four groups matched on the basis of intelligence quotient, sex, age, and socio-economic status. The experimental procedure consisted of pre-test, presentation, and post-test all within a period of one hour. A retention test was also administered after a three week interval of no exposure to the same subject matter. Statistical analysis using Tukey's test for significance revealed that no one method could be considered superior or inferior to any other. This was found to be true for both acquisition and retention comparisons.

Matosumoto\textsuperscript{12} compared a film, slides, and a tape recorded dramatization in teaching the judicial process. Three groups of sixth graders (N=90) were tested using an objective test before and after the educational presentations. The results of this investigation showed that the audio-visual methods were more effective than the audio method. The film group made the greatest achievement, however, this difference was statistically significant only at the .05 level when compared to the dramatization group.

In summary, one study demonstrated the superiority of a motion picture film when compared to a filmstrip, another study reported opposite results, and five demonstrated no significant difference between these audio-visual media. Therefore, this portion of the review of literature indicated that audio-visual media are more effective than no instruction, a field trip or a dramatized tape recording and that films and filmstrips are, in general, equally effective.

III. STUDIES RELATED TO THE COMPARATIVE EFFECTIVENESS OF TEXTUAL MATERIALS, FILMS, AND FILMSTRIPS

Only one study was found which parallels the general topic of this study, the effectiveness of a booklet, a film, and a filmstrip. This study was completed by Le Anderson¹³ and investigated the relative merit of an instructional manual, film, filmstrip, and a combination of all three media in teaching knowledge of telephone communication. Five groups of fifth grade pupils (N=350) were equated according to initial test scores and intelligence quotients and were given equal lengths of instruction. The general conclusion of this study was that the combination of all media produced the highest level of achievement. However,

the results indicated that all media were effective and that no significant differences could be found among the manual, the film, and the filmstrip.

The fact that only one study was found which investigated the individual and comparative effectiveness of a booklet, film, and filmstrip in teaching the same knowledge, demonstrated need for further study in this area of pedagogy. Le Anderson's study concluded that a combination of all three media was best and that no one medium when used singly was more effective than another. However, it cannot be assumed that the same findings would be true for a different topic, age group, or educational level.
CHAPTER III

PROCEDURE OF THE STUDY

I. OVERVIEW

This study was designed to evaluate the effectiveness of a booklet, a film, and a filmstrip in disseminating knowledge of the care and prevention of injuries of insensitive feet to 135 adult diabetics of three different educational levels. Each of the instructional media was comparable in content and illustration and were presented in a twenty-six minute educational period. Prior to and succeeding the educational presentation, the subjects' knowledge of the care and prevention of injuries to insensitive feet was evaluated using a multiple-choice achievement test. Inferences concerning the effectiveness of the educational media in disseminating knowledge, the effectiveness of the educational presentations upon increasing the knowledge of learners of different educational levels, and the interaction between the educational media and educational level were drawn from statistical analysis of the subjects performances on an achievement test.
II. EDUCATIONAL MEDIA

Cartoon booklet.—In 1967, a cartoon booklet was developed to teach leprosy patients the care and prevention of injuries to insensitive feet.1 This booklet was entitled The Care and Prevention of Injuries to Insensitive Feet and was made possible by a Rehabilitation Service Administration research grant awarded to the Department of Health, Physical, and Recreation Education, Louisiana State University, Baton Rouge, Louisiana. The efforts to develop this booklet were coordinated with the medical and rehabilitation staff at the United States Public Health Service Hospital at Carville, Louisiana. A cartoon style booklet was employed because of the low level of reading ability of the target population and for motivational purposes. The booklet, fifty-four pages in length, presented seven single concept lessons. Each lesson had a brief text, presented in English and Spanish, which was reinforced by the use of cartoon drawings.

Audio-visual media.—Using the same material as presented in the cartoon booklet, a color-sound motion picture and a color-sound filmstrip were developed in March, 1968. The content coverage of the film and the filmstrip were comparable to the cartoon booklet, although the narration was longer, and in some cases the material presented in each lesson was reorganized to better fit the unique

characteristics of the film or filmstrip. The illustrations used in the film and filmstrip were basically the same as those used in the booklet. The only exceptions to this were that the filmstrip was limited to sixty illustrations and that the film used some motion sequences. The equipment used to present these audio-visual media was a sixteen millimeter, sound, motion picture projector; a screen; and a sound filmstrip projector. The sound filmstrip projector used was a LaBelle Courier which utilized separate removable cartridges for both the narration and the visual presentations. The audio tape recording contained a subsonic signal which advanced the filmstrip on cue. The still pictures were projected onto a six-inch by eight-inch screen on the front of the projection unit.

III. DEVELOPMENT OF THE ACHIEVEMENT TEST

A multiple-choice achievement test was constructed to evaluate the subjects' knowledge of the care and prevention of injuries to insensitive feet prior to and succeeding the educational presentations. This multiple-choice test was an objective test which required the examinee to choose all the correct answers for each question. Twenty-five questions were constructed each having four answer foils, and each question was accompanied by an illustration or illustrations. It was hoped that this format aided those

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2LaBelle Courier, LaBelle Industries Incorporated, Oconomowoc, Wisconsin.
subjects who, because of low educational ability, had difficulty interpreting the questions or answer foils.

In addition to evaluating the subjects' knowledge of the care and prevention of injuries to insensitive feet, the achievement test booklet provided space for the purpose of collecting personal data about each testee. These data included name, age, sex, and grade level completed in school and were utilized to classify and describe the subjects tested in this study.

Validity

Analysis of a test to determine if it measured what it intended to measure can be achieved through content validity. Content validity is the most important aspect of an achievement test. A test that accurately reflects the subject matter taught can be said to exhibit content validity. For this achievement test, content validity was demonstrated by comparing the test questions to the content of the cartoon booklet. This was done by this writer, members of his advisory committee, and members of the medical staff at the United States Public Health Service Hospital, Carville, Louisiana.

Reliability

Information concerning how consistently a test measures a given ability is called a reliability estimate.

Reliability indicates how accurately the student's true achievement was measured by the test. This is indicated if the coefficient of reliability is high. If the reliability is low this indicates that the component of ability is small. "The reliability coefficient becomes, then, a measure of the extent to which true ability exceeds error in the obtained scores."\textsuperscript{4}

The reliability of this test was determined by using the split-halves, zero-order correlation technique between odd and even test items. The Spearman-Brown Prophecy Formula was used to lengthen the test statistically and to estimate the reliability of the test on the basis of the pre-test data for all 135 subjects.\textsuperscript{5} The reliability coefficient for the test was found to be .74.

In regard to the standard of reliability which an achievement test should equal or surpass, Kelley\textsuperscript{6} stated that a coefficient of correlation of .50 is the lowest estimate which is adequate when levels of group achievement are being compared. Bookwalter\textsuperscript{7} categorized coefficients of reliability as follows: very high, .90 or above; high, .89 to


\textsuperscript{5}Ibid., pp. 339-340.

\textsuperscript{6}Truman Lee Kelley, Interpretation of Educational Measurements (New York: World Book Co., 1927), pp. 28-29.

.80; average, .79 to .60; considerable, .59 to .40; and insignificant, .39 or below. However, certain precautions must be taken in considering the standard of reliability which is deemed appropriate. These precautions would include the type of measurement, the technique of correlation used, and the purpose of the test. Using these standards, the test exhibited satisfactory reliability.

Usability

The tests were reproduced and distributed to the subjects in the form of a test booklet. This test booklet was comprised of instructions for the test, a sample question, and the twenty-five test questions. The subjects were permitted to mark their answer choices in the space provided next to each of the possible answers in the test booklet. The test was scored on the basis of the total number of correct responses. A correct response was defined as marking the correct answer or answers and leaving the wrong answer foil or foils unmarked. The highest possible score was a total of 100 points.

IV. SUBJECTS

The number of subjects used in this study was 135 adult diabetics of several races. Diabetics were used because they have a tendency to develop foot problems which are similar to those afflicting the Hansen's disease patient.8

Diabetics were also used in this study because Hansen's disease patients shy away from mass meetings and attempt to remain anonymous due to the stigma associated with their affliction.\(^9\) Therefore, a more extensive sampling of subjects with common disabilities was available by having used diabetics.

The diabetics used in this study were tested during May and June, 1968. They were members of the Baton Rouge Lay Society of the Diabetes Association, Baton Rouge, Louisiana, the South Texas Diabetes Association, Houston, Texas or were outpatients of the Diabetic Clinic, Ben Taub General Hospital, Houston, Texas. The subjects were adult males and females and ranged in age from twenty-four to eighty-five years. The average age of the subjects was fifty-seven years.

While the data from 135 diabetics were used in this study, 178 subjects were tested. The data from forty-three subjects were not used for one or more of the following reasons: they did not follow instructions in answering either the pre- or post-test, or they were unable to complete the procedure of this study because of vision problems, illness, or prior appointments.

\(^9\)Interview with Paul Brand, Loc. cit.
V. GROUP TREATMENTS AND CLASSIFICATIONS

The subjects were used to form three treatment groups on the basis of the educational media they were randomly presented. Each of these three treatment groups were then subdivided into three educational level classifications according to the highest grade level in school that the subjects had completed. The nine resulting groups were identified and treated as follows:

Group A. Instruction by the booklet, high educational level.—The fifteen diabetics in this group read and studied the booklet two consecutive times during the twenty-six minute educational period. The average age of the subjects in this group was fifty-five years, and they had completed ten or more years of school.

Group B. Instruction by the film, high educational level.—The fifteen diabetics in this group saw the film two consecutive times during the twenty-six minute educational period. The average age of the subjects in this group was fifty-six years and they had completed ten or more years of school.

Group C. Instruction by the filmstrip, high educational level.—The fifteen diabetics in this group saw the filmstrip two consecutive times during the twenty-six minute educational period. The average age of the subjects in this group was fifty-five and they had completed ten or more years of school.
Group D. Instruction by booklet, medium educational level.—The fifteen diabetics in this group read and studied the booklet two consecutive times during the twenty-six minute educational period. The average age of the subjects in this group was fifty-one years and they had completed at least seven but not more than nine years of school.

Group E. Instruction by film, medium educational level.—The fifteen diabetics in this group saw the film two consecutive times during the twenty-six minute educational period. The average age of the subjects in this group was fifty-six years and they had completed at least seven but not more than nine years of school.

Group F. Instruction by filmstrip, medium educational level.—The fifteen diabetics in this group saw the filmstrip two consecutive times during the twenty-six minute educational period. The average age of the subjects in this group was fifty-seven years and they had completed at least seven but not more than nine years of school.

Group G. Instruction by booklet, low educational level.—The fifteen diabetics in this group read and studied the booklet two consecutive times during the twenty-six minute educational period. The average age of the subjects in this group was sixty-two and they had completed six or less years of school.

Group H. Instruction by film, low educational level. The fifteen diabetics in this group saw the film two
consecutive times during the twenty-six minute educational period. The average age of the subjects in this group was sixty years and they had completed six or less years of school.

Group I. Instruction by filmstrip, low educational level.—The fifteen diabetics in this group saw the filmstrip two consecutive times during the twenty-six minute educational period. The average age of the subjects in this group was sixty years and they had completed six or less years of school.

VI. PROCEDURE FOR THE ADMINISTRATION OF THE ACHIEVEMENT TEST AND EDUCATIONAL PRESENTATION

The description of the procedure of this study was presented in sequential order. The following headings were used: Administration of the Pre-Educational Presentation Achievement Test, Educational Presentations, and Administration of the Post-Educational Presentation Achievement Test.

Administration of the Pre-Educational Presentation Achievement Test

The subjects were assembled in a room with adequate physical facilities and were given a brief overview of the purpose of the study and tasks which they were about to undertake. Next, the subjects were given a pencil and an achievement test booklet. The instructions for the test were read aloud and the subjects were directed to answer a sample multiple-choice question. The subjects were then
allowed to ask questions about how to take the test. Following this, the subjects were told to remain quiet and in their chair until the test was over. The subjects who were members of the Baton Rouge, Louisiana and Houston, Texas Diabetes Associations were easily able to read the test. However, it was found necessary to read the entire test aloud to the subjects tested at the Diabetic Clinic, Ben Taub Hospital, Houston, Texas.

**Educational Presentations**

The educational media were presented to the subjects in a twenty-six minute period. A rest period, two minutes in length, was given during the educational period but was not counted in the time allowed for the presentations.

The educational presentations were randomly shown to the subjects used in this study. This was achieved through the use of two grouping techniques. The first technique used was to mark each pre-test with a number ranging from one to three. The tests were then alternately distributed to the subjects. After the subjects had completed the test they were grouped according to the number on their test booklet and told where to report for their educational presentation. This method was used primarily when a large number of subjects were tested and presented the educational media. The second technique was used with the small groups of subjects who were tested and presented the educational
media during their appointment at the Diabetic Clinic at Ben Taub Hospital. These smaller groups of subjects, three to twenty diabetics per appointment, were tested and one educational medium, selected at random, was presented to the entire group.

A twenty-six minute educational period was chosen because it allowed two showings of either the film or the filmstrip, was assumed to be within the attention span of the subjects used in this study, and appeared to be a practical length of time for conducting an outpatient health education program. In addition, the use of a constant time interval allowed more precise evaluation of the effectiveness of the educational media.

The repetitive presentation of the educational media was done to allow uniformity of the length of the educational periods and to enhance the subjects' chance of learning the material presented. Allen\(^\text{10}\) stated that repetitive showing of a motion picture film has been found to increase learning significantly and that this technique is as effective as any other participation technique.

**Administration of the Post-Educational Presentation Achievement Test**

Following the educational presentations, the subjects who were members of the diabetic associations were

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reassembled in the room used for initial testing. Those subjects who were tested at the hospital were tested in the same room that was used for the educational presentation. The same multiple-choice test was administered to the subjects, and they were told to include the following personal data: age, sex, and grade level completed. Efforts were made to insure that the same conditions which existed during the initial testing prevailed for the final testing session. The test booklets and pencils were distributed to the subjects and the instructions were read aloud. The subjects read the tests themselves, with the exception of those subjects tested at The Diabetic Clinic. When all subjects had completed the test, the achievement test booklets and pencils were collected, the cooperation of the subjects was acknowledged, and the group was dismissed.

VII. PILOT STUDY

Prior to the implementation of this investigation, a pilot study was conducted. The purposes of the pilot study were to estimate the reliability of the multiple-choice achievement test and to determine the effectiveness of the cartoon booklet with college students who were allowed eleven minutes to read and study the booklet. Analysis of the data collected, using three part analysis of variance,\(^\text{11}\)

showed that the subjects made a significant gain in knowledge, at the .01 level of confidence, by studying the booklet. (See Table I) The reliability of the achievement test was calculated using the Spearman-Brown Prophecy Formula for estimating reliability for an odd-even split halves zero order correlation. The reliability estimate was .74 and with this small number of subjects indicated satisfactory reliability for an objective test. The test was also analyzed to locate nonfunctioning distractors and minor revisions were made to improve the test.

### TABLE I

**SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 COLLEGE STUDENTS USED IN THE PILOT STUDY**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>$\bar{M}^2$</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>1628.03</td>
<td>1</td>
<td>1628.03</td>
<td>45.27</td>
<td>.01</td>
</tr>
<tr>
<td>Among subjects</td>
<td>392.80</td>
<td>14</td>
<td>28.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>503.47</td>
<td>14</td>
<td>35.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2524.30</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-Ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.

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VIII. STATISTICAL ANALYSIS

The data used in this study were derived from achievement test scores. These scores were used to represent the subject's knowledge of the care and prevention of injuries to insensitive feet. One observation was drawn before the educational presentations and the second was taken after the media had been presented.

Three-part analysis of variance was used to determine the significance between the correlated means of each of the nine groups used in this study. This technique indicated whether the groups made significant mean changes in knowledge as to the care and prevention of injuries to insensitive feet as a result of the educational media.

A three by three factorial analysis of variance employing planned orthogonal comparisons was used. This allowed investigation of the differences among the three educational media in disseminating knowledge, the differences in the effectiveness of the educational media among the three educational levels, and the interaction effects of media and educational levels.
CHAPTER IV

ANALYSIS OF DATA

I. INTRODUCTION

In order to determine the effectiveness of the booklet, film, and filmstrip in disseminating knowledge of the care and prevention of injuries to insensitive feet to high, medium, and low educational level diabetics, the following statistical techniques were used: (1) three-part analysis of variance and (2) three by three factorial analysis of variance with planned orthogonal comparisons.

II. THE SIGNIFICANCE OF THE MEAN GAINS OF THE NINE GROUPS IN KNOWLEDGE

The significance of the mean gains in knowledge of the care and prevention of injuries to insensitive feet was determined by using three-part analysis of variance. This statistical method was employed due to the fact that the same subjects comprised both the pre-educational and post-educational achievement test scores.

With 1 and 14 degrees of freedom F-ratios of 4.60 and 8.86 were needed, respectively, for significance at the .05 and .01 level of confidence. Using these standards,
the following F-ratios resulted from the computation of the three-part analysis of variance for each of the nine groups used in this study.

Group A (instruction by the booklet, high educational level) had an F-ratio of 11.69 which exceeded the F-ratio needed for significance at the .01 level of confidence. Thus, it may be stated that instruction by the booklet for the high educational level group resulted in significant gains in knowledge as to the care and prevention of injuries to insensitive feet. See Table II.

TABLE II

SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 HIGH EDUCATIONAL LEVEL, ADULT DIABETICS WHO READ THE BOOKLET

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>M²</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>790.54</td>
<td>1</td>
<td>790.54</td>
<td>11.69</td>
<td>.01</td>
</tr>
<tr>
<td>Among subjects</td>
<td>3817.67</td>
<td>14</td>
<td>272.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>946.46</td>
<td>14</td>
<td>67.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5554.67</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.

Group B (instruction by film, high educational level) had an F-ratio of 73.94 which exceeded the F-ratio needed for significance at the .01 level of confidence. Therefore,
instruction by film for the subjects of the high educational level group produced significant gains in knowledge of the care and prevention of injuries to insensitive feet. See Table III.

**TABLE III**

SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 HIGH EDUCATIONAL LEVEL, ADULT DIABETICS WHO SAW THE FILM

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>M^2</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>1657.64</td>
<td>1</td>
<td>1657.64</td>
<td>73.94</td>
<td>.01</td>
</tr>
<tr>
<td>Among subjects</td>
<td>833.87</td>
<td>14</td>
<td>59.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>313.86</td>
<td>14</td>
<td>22.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2805.37</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.

Group C (instruction by filmstrip, high educational level) had an F-ratio of 77.77 which exceeded the F-ratio needed for significance at the .01 level of confidence. Instruction by the filmstrip, for the subjects of the high educational level group brought about significant gains in knowledge of the care and prevention of injuries to insensitive feet. See Table IV.
TABLE IV
SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 HIGH EDUCATIONAL LEVEL, ADULT DIABETICS WHO SAW THE FILMSTRIP

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>M^2</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>1228.80</td>
<td>1</td>
<td>1228.80</td>
<td>77.77</td>
<td>.01</td>
</tr>
<tr>
<td>Among subjects</td>
<td>1223.87</td>
<td>14</td>
<td>87.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>221.20</td>
<td>14</td>
<td>15.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2673.87</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.

Group D (instruction by booklet, medium educational level) had an F-ratio of 30.61 which exceeded the F-ratio needed for significance at the .01 level of confidence. Thus, it can be stated that instruction by the booklet for the medium educational level group resulted in significant gains in knowledge of the care and prevention of injuries to insensitive feet. See Table V.

TABLE V
SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 MEDIUM EDUCATIONAL LEVEL, ADULT DIABETICS WHO READ THE BOOKLET

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>M^2</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>1178.13</td>
<td>1</td>
<td>1178.13</td>
<td>30.61</td>
<td>.01</td>
</tr>
<tr>
<td>Among subjects</td>
<td>823.80</td>
<td>14</td>
<td>58.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>538.87</td>
<td>14</td>
<td>38.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2540.80</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.
Group E (instruction by film, medium educational level) had an F-ratio of 36.82 which exceeded the F-ratio needed for significance at the .01 level of confidence. Instruction by the film for the medium educational level group brought about significant gains in knowledge of the care and prevention of injuries to insensitive feet. See Table VI.

TABLE VI

SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 MEDIUM EDUCATIONAL LEVEL, ADULT DIABETICS WHO SAW THE FILM

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>M^2</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>1293.64</td>
<td>1</td>
<td>1293.64</td>
<td>36.82</td>
<td>.01</td>
</tr>
<tr>
<td>Among subjects</td>
<td>1167.47</td>
<td>14</td>
<td>83.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>491.86</td>
<td>14</td>
<td>35.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2952.97</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.

Group F (instruction by filmstrip, medium educational level) had an F-ratio of 1.62 which did not reach the F-ratio needed for significance at the .05 level of confidence. Therefore, in this sample, instruction by the filmstrip for the medium educational level group was not found to produce a significant gain in knowledge of the care and prevention of injuries to insensitive feet. See Table VII.
### TABLE VII
**SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 MEDIUM EDUCATIONAL LEVEL, ADULT DIABETICS WHO SAW THE FILMSTRIP**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>$M^2$</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>213.33</td>
<td>1</td>
<td>213.33</td>
<td>1.62</td>
<td>NS</td>
</tr>
<tr>
<td>Among subjects</td>
<td>1326.50</td>
<td>14</td>
<td>94.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>1842.17</td>
<td>14</td>
<td>131.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3382.00</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.

Group G (instruction by booklet, low educational level) had an F-ratio of 9.57 which exceeded the F-ratio needed for significance at the .01 level of confidence. Thus, instruction by the booklet produced significant gains in knowledge of the care and prevention of injuries to insensitive feet for subjects of the low educational level group. See Table VIII.

### TABLE VIII
**SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 LOW EDUCATIONAL LEVEL, ADULT DIABETICS WHO READ THE BOOKLET**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>$M^2$</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>270.00</td>
<td>1</td>
<td>270.00</td>
<td>9.57</td>
<td>.01</td>
</tr>
<tr>
<td>Among subjects</td>
<td>2206.87</td>
<td>14</td>
<td>157.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>395.00</td>
<td>14</td>
<td>28.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2871.87</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.
Group H (instruction by film, low educational level) had an F-ratio of 4.77 which exceeded the F-ratio needed for significance at the .05 level of confidence. Therefore, it may be stated that for subjects of the low educational level group the film brought about significant gains in knowledge of the care and prevention of injuries to insensitive feet. See Table IX.

### TABLE IX

**SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 LOW EDUCATIONAL LEVEL, ADULT DIABETICS WHO SAW THE FILM**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>$M^2$</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>120.00</td>
<td>1</td>
<td>120.00</td>
<td>4.77</td>
<td>.05</td>
</tr>
<tr>
<td>Among subjects</td>
<td>2209.87</td>
<td>14</td>
<td>157.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>352.00</td>
<td>14</td>
<td>25.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2681.87</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.

Group I (instruction by the filmstrip, low educational level) had an F-ratio of 10.43 which exceeded the F-ratio needed in this study for significance at the .01 level of confidence. Instruction by the filmstrip for subjects of the low educational level group produced significant gains in knowledge of the care and prevention of injuries to insensitive feet. See Table X.
TABLE X

SIGNIFICANCE OF MEAN GAINS IN KNOWLEDGE FOR 15 LOW EDUCATIONAL LEVEL, ADULT DIABETICS WHO SAW THE FILMSTRIP

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>M^2</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between trials</td>
<td>551.43</td>
<td>1</td>
<td>551.43</td>
<td>10.43</td>
<td>.01</td>
</tr>
<tr>
<td>Among subjects</td>
<td>2059.47</td>
<td>14</td>
<td>147.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>740.07</td>
<td>14</td>
<td>52.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3350.97</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence, 4.60; for the .01 level, 8.86.

It was found that each of the groups, except group F (instruction by filmstrip, medium educational level) made significant gains in knowledge. The nonsignificant F-ratio for the subjects of the medium educational level group instructed by the filmstrip does not necessarily indicate that the filmstrip is an ineffective educational medium for subjects who have completed seven to nine years of formal education. Garrett\(^1\) stated that, "Judgements concerning differences are never absolute, but on the contrary range over a scale of probability." Therefore, caution must be exercised in interpreting this finding, especially, in view of the effectiveness of the filmstrip as an educational medium with

subjects of high and low educational levels. Logically, the filmstrip would also be effective for medium educational level subjects. Thus, the difference found, in this case, was noted as a chance occurrence. In summary, the booklet, film, and filmstrip, as noted, were found to be effective in disseminating knowledge of the care and prevention of injuries to insensitive feet to diabetics of diverse educational levels.

III. THREE BY THREE FACTORIAL ANALYSIS OF VARIANCE WITH PLANNED ORTHOGONAL COMPARISONS

A three by three factorial analysis of variance was used to determine if there were significant differences among the educational media in disseminating knowledge, if there were significant differences in the effect of the educational presentation among the three educational level groups, and if there were significant interaction effects among the three educational media and three educational levels. The data used in this analysis were gains in knowledge, as represented by the difference between the pre-educational and post-educational presentation achievement test scores.

The use of planned orthogonal comparisons allowed these comparisons to be computed in the event that nonsignificant F-ratios were found for the treatment levels.²

Orthogonal comparisons were planned and computed for treatment levels of A, educational media; levels of B, educational levels; and AxB, interaction effects of educational media and educational levels.

Analysis of variance was used due to the fact that the correlation between the pre-educational presentation achievement test scores and the gains was found to be -.08. A coefficient of correlation of this slight magnitude revealed that the influence of the pre-educational presentation test score on the post-educational presentation test score was almost negligible. A negative correlation indicated that the subjects making the highest pre-educational presentation test scores made the lowest gains; however, it must be noted that a coefficient of this size represents very slight relationship between these variables.

**Three by Three Factorial Analysis of Variance**

In order to give an indication of the extent of the differences among the levels of A, educational media; levels of B, educational level; and AxB interaction, the effect of one variable in the presence of the other, overall F-ratios were computed for the factorial analysis of variance. This step could have been omitted because of the use of planned orthogonal comparison. However, these overall F-ratios were made and are presented in Table XI to simplify the presentation of the findings of this study.
TABLE XI

ANALYSIS OF VARIANCE OF GAINS IN KNOWLEDGE OF 135 ADULT DIABETICS OF THREE EDUCATIONAL LEVELS WHO WERE PRESENTED THREE EDUCATIONAL MEDIA

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>M^2</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Among Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>52.99</td>
<td>2</td>
<td>26.50</td>
<td>&lt;1</td>
<td>NS</td>
</tr>
<tr>
<td>B</td>
<td>879.18</td>
<td>2</td>
<td>439.59</td>
<td>6.58</td>
<td>.01</td>
</tr>
<tr>
<td>AxB</td>
<td>892.72</td>
<td>4</td>
<td>223.18</td>
<td>3.34</td>
<td>.05</td>
</tr>
<tr>
<td>Error</td>
<td>8421.46</td>
<td>126</td>
<td>66.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10246.37</td>
<td>134</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence with 2 and 126 degrees of freedom, 3.07; for the .01 level, 4.78.

F-ratio needed for significance at the .05 level of confidence with 4 and 126 degrees of freedom, 2.44; for the .01 level, 3.47.

The results of the F-test for the levels of A of the factorial design for the difference among the educational media in disseminating knowledge of the care and prevention of injuries to insensitive feet was a ratio of less than one. This indicated no significant differences in effectiveness among the three media. The F-ratio needed for 2 and 126 degrees of freedom at the .05 level of confidence was 3.07. This was investigated further by the use of the planned orthogonal comparisons which are reported later in this chapter.
The F-ratio for the levels of B, the effects of the educational media upon subjects of the high, medium, and low educational levels, was 6.58. This exceeded the F-ratio of 4.78 which was needed for significance at the .01 level for 2 and 126 degrees of freedom. This denoted that one or more of the educational levels received greater gains in knowledge than the other educational level or levels as a result of the educational presentations. The location and extent of these differences among the three educational levels were determined by the use of planned orthogonal comparisons which are reported later in this chapter.

A significant interaction effect, AxB, was found between the educational media and educational level. The F-ratio for interaction was 3.34 and with 4 and 126 degrees of freedom, surpassed the F-ratio of 2.44 needed for significance at the .05 level of confidence. Significant interaction indicated that the effects of the selected educational media were not consistent at the different educational levels. Analysis to determine these unique differences was computed using planned orthogonal patterns and are reported later in this chapter.

Planned Orthogonal Comparisons for Differences Among the Three Educational Media

While it was determined by the nonsignificant F-ratio that the three educational media, levels of A, were equally
effective in disseminating knowledge of the care and prevention of injuries to insensitive feet to diabetics, further investigation was permissible because of the use of planned orthogonal comparisons. The purpose of the planned orthogonal comparison was to analyze the sums of squares attributed to the levels of A of the treatment variance. Since there were three educational media only two orthogonal comparisons can be computed. The reason for this is that the number of comparisons which can be legally made is one less than the total number of treatments (N-1). The results of these comparisons are presented in Table XII.

TABLE XII

COMPARISON OF DIFFERENCES AMONG GAINS IN KNOWLEDGE OF 135 ADULT DIABETICS AS A RESULT OF THE EDUCATIONAL MEDIA

<table>
<thead>
<tr>
<th></th>
<th>Book</th>
<th>Film</th>
<th>Film-strip</th>
<th>SS</th>
<th>df</th>
<th>M²</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>mean</td>
<td>mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.6</td>
<td>10.7</td>
<td>9.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C₁</td>
<td>2</td>
<td>-1</td>
<td>-1</td>
<td>3.11</td>
<td>1</td>
<td>3.11</td>
<td>&lt;1</td>
<td>NS</td>
</tr>
<tr>
<td>C₂</td>
<td>0</td>
<td>-1</td>
<td>1</td>
<td>49.88</td>
<td>1</td>
<td>49.88</td>
<td>&lt;1</td>
<td>NS</td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td>8421.47</td>
<td>126</td>
<td>68.84</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence with 1 and 126 degrees of freedom, 3.92; for the .01 level, 6.84.

In comparison one (C₁) the effectiveness of the booklet was tested versus the combined effectiveness of the film and filmstrip. The purpose of this comparison was to
determine if any significant difference existed between the effectiveness of textual materials as compared to the audio-visual materials in disseminating knowledge. The F-ratio was found to be less than one and failed to meet the test for significance at the .05 level of confidence which required an F-ratio of 3.92 for 1 and 126 degrees of freedom. Consequently, the booklet and the audio-visual media were found to be equally effective in disseminating knowledge of the care and prevention of injuries to insensitive feet.

Comparison two \((C_2)\) was used to determine if any difference existed between the effectiveness of the film as compared to the filmstrip in disseminating knowledge. The F-ratio needed for significance at the .05 level of confidence with 1 and 126 degrees of freedom was 3.92 which exceeded the F-ratio of less than one which was found for comparison two. Thus, no significant difference was found between the film and filmstrip in disseminating knowledge.

In summary, it appeared that the three educational media used in this study were equally effective in disseminating knowledge in the care and prevention of injuries to insensitive feet. Thus, when the subjects were presented the media without respect to educational level the booklet, film, and filmstrip were found to have brought about similar increases in knowledge.
Planned Orthogonal Comparisons for Difference Among the Three Educational Levels

Planned orthogonal patterns were employed to locate the nature of the differences found among the three educational levels as indicated by the significant F-ratio for the levels of B in Table XI. Since there were three classifications of educational level, two comparisons were computed. The results of these comparisons are shown in Table XIII.

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>SS</th>
<th>df</th>
<th>$M^2$</th>
<th>F-Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>mean</td>
<td>mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C₁</td>
<td>12.7</td>
<td>10.3</td>
<td>6.5</td>
<td>540.46</td>
<td>1</td>
<td>540.46</td>
<td>8.09</td>
<td>.01</td>
</tr>
<tr>
<td>C₂</td>
<td>0</td>
<td>-1</td>
<td>1</td>
<td>336.40</td>
<td>1</td>
<td>336.40</td>
<td>5.03</td>
<td>.05</td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td>8421.27</td>
<td>126</td>
<td></td>
<td>68.84</td>
<td></td>
</tr>
</tbody>
</table>

F-ratio needed for significance at the .05 level of confidence with 1 and 126 degrees of freedom, 3.92; for the .01 level, 6.84.

The first comparison was between the effectiveness of the educational presentation with subjects classified according to high educational level and the effectiveness of the presentation upon the medium and low educational levels.
combined. This comparison was found to be significant as the F-ratio obtained was 8.09 which exceeded the F-ratio needed for significance at the .01 level of confidence with 1 and 126 degrees of freedom, 6.84. Inspection of the means indicated that the high educational level group made significantly greater gains in knowledge than the subjects of the medium and low educational level groups.

The purpose of the second comparison was to compare the two lowest classifications of educational level to determine if the educational media were more effective with one group than the other. This comparison was between the medium and low educational level, and the F-ratio was found to be 5.03. This F-ratio was significant and exceeded the F-ratio of 3.92 needed for significance at the .05 level of confidence for 1 and 126 degrees of freedom. The mean gain in knowledge for the medium educational level group was found to be higher than the mean gain in knowledge for the low educational level group. This comparison indicated that a significant difference existed in favor of the medium educational level group. Hence, the educational media were more effective for subjects classified according to the medium educational level than for subjects of the low educational level.

The findings of the orthogonal comparisons computed to determine the extent and location of the differences among the three educational level in gains in knowledge
revealed that the high level learned more than the medium and low classification. Secondly, that the medium educational level subjects received greater benefits in gains in knowledge than the low educational level subjects. However, it must be remembered that the low educational groups made significant gains in knowledge but to a lesser degree than either of the two higher educational level groups.

**Planned Orthogonal Comparisons for Interaction Effects**

In order to determine the extent and location of the differences which existed for the interaction between the educational media and the educational levels, as indicated in Table XI, planned orthogonal comparisons were computed. The number of comparisons which were computed was fixed at four because two comparisons were made for the levels of A and two for the levels of B. These comparisons and the resulting F-ratios were made on the basis of each of the nine individual educational media and educational level groups used in this study.

The purpose of planned orthogonal comparisons was to determine where the unique differences existed when the three educational media were considered with respect to the three educational levels. On the basis of these computations the unique differences, or inconsistencies, of the findings for the levels of A and the levels of B were determined. The questions concerning which of the particular
educational media brought about the greatest gain in knowledge for a given educational level were thus answered.

The F-ratios shown in Table XIV for comparison \(A_1B_1\), \(A_1B_2\), and \(A_2B_1\) were 2.36, 1.20, and less than 1, respectively. These three comparisons are nonsignificant as the F-ratio needed at the .05 level of confidence with 1 and 126 degrees of freedom was 3.92. The fourth comparison \(A_2B_2\) resulted in an F-ratio of 9.78 which exceeded the F-ratio of 6.84 needed for significance at the .01 level with 1 and 126 degrees of freedom.

The three nonsignificant F-ratios indicated that the effectiveness of the educational media in the presence of the educational levels were uniform as demonstrated by the prior computations for the levels of A and B. The significant F-ratio for comparison \(A_2B_2\) indicated a deviation in the difference of the effectiveness of the film and the filmstrip within the groups of subjects of medium and low educational levels. Inspection of the mean gains in knowledge for the medium educational level subjects instructed by the film and the filmstrip indicated that the film was the most effective audio-visual media for this particular educational level. However, the previously mentioned possible chance error involving the filmstrip for the medium educational level group should be considered in this specific instance. This comparison also indicated that instruction by the filmstrip resulted in significantly greater gains in knowledge.
### TABLE XIV

COMPARISON OF DIFFERENCES OF THE INTERACTION EFFECTS AMONG THREE EDUCATIONAL MEDIA AND THREE EDUCATIONAL LEVELS FOR 135 ADULT DIABETICS

<table>
<thead>
<tr>
<th>Group-Book</th>
<th>Book</th>
<th>Book</th>
<th>Film</th>
<th>Film</th>
<th>Film</th>
<th>Film-</th>
<th>Film-</th>
<th>Film-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Mean Gains</td>
<td>10.3</td>
<td>12.5</td>
<td>6.0</td>
<td>14.9</td>
<td>13.1</td>
<td>4.0</td>
<td>12.8</td>
<td>5.3</td>
</tr>
</tbody>
</table>

| $C_{A_1B_1}$ | -4  | 2   | 2   | -1  | -1  | 2   | -1   | -1   | 157.90 | 1   | 157.90 | 2.36 NS |
| $C_{A_1B_2}$ | 0   | -2  | 2   | 0   | 1   | -1  | 0    | 1    | 80.00  | 1   | 80.00  | 1.20 NS |
| $C_{A_2B_1}$ | 0   | 0   | 0   | 2   | -1  | -1  | -2   | 1    | 3.76   | 1   | 3.76   | <1 NS  |
| $C_{A_2B_2}$ | 0   | 0   | 0   | 0   | 1   | -1  | 0    | -1   | 653.40 | 1   | 653.40 | 9.78 .01 |

Error

8421.47  126  68.84

F-ratio needed for significance at the .05 level of confidence, 3.92; at the .01 level, 6.84.
for the subjects of the low educational level than did instruction by the film.

In summary, the location and extent of the unique differences between the educational media and the educational levels were determined by the use of planned orthogonal comparisons. The interaction effect of levels of A and B was shown to exist only in one of the four allotted comparisons. These inconsistencies in the effectiveness of the educational media in the company of the educational levels were found in the advantage of the film as compared to the filmstrip for subjects of the medium educational level. Secondly, the same comparison demonstrated the superiority of the filmstrip over the film for the low educational level subjects used in this study.
CHAPTER V

SUMMARY, FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER STUDY

I. SUMMARY

It was the purpose of this study to investigate the effectiveness of a booklet, film, and filmstrip in disseminating knowledge of the care and prevention of injuries of insensitive feet to adult diabetics classified according to high, medium, and low educational levels. More specifically this study was to determine the effectiveness of the educational media in disseminating knowledge, to determine the effectiveness of the educational presentations with subjects of different educational levels, and to determine any possible interaction as to the effects of the three educational media with regard to the three educational levels.

The subjects used in this study were 135 adult diabetics, ranging in age from twenty-four to eighty-five years. The data were collected during May and June, 1968 in Baton Rouge, Louisiana and Houston, Texas. The subjects used in this study were either members of local diabetes associations or outpatients of a diabetic clinic.
These subjects were used to form three treatment
groups on the basis of the educational media they were ran-
domly presented. Each of these three treatment groups were
then subdivided into three educational level classifications
according to the highest grade level in school that the sub-
ject had completed. The nine resulting groups were cited as
follows: (1) Group A, instruction by booklet, high educa-
tional level; (2) Group B, instruction by film, high educa-
tional level; (3) Group C, instruction by filmstrip, high
educational level; (4) Group D, instruction by booklet, medium
educational level; (5) Group E, instruction by film, medium
educational level; (6) Group F, instruction by filmstrip,
medium educational level; (7) Group G, instruction by book-
let, low educational level; (8) Group H, instruction by film,
low educational level; (9) Group I, instruction by filmstrip,
low educational level.

A multiple-choice achievement test was administered
prior to and succeeding the presentation of the educational
media. The educational period lasted twenty-six minutes and
consisted solely of two consecutive presentations of the
booklet, film, or filmstrip.

In order to determine the effectiveness of the edu-
cational media in disseminating knowledge to adult diabetics
of different educational levels, three-part analysis of
variance and a three by three factorial analysis of variance
with planned orthogonal comparisons were used. Statistical
analysis employing three part analysis of variance was computed for each of the nine groups to determine the significance of the mean gains in knowledge. Using a three by three factorial analysis of variance with planned orthogonal comparisons, the nature of the differences among the three educational media in disseminating knowledge, the effectiveness of the presentation in relation to educational level, and the interaction of educational media and grade level were determined.

II. FINDINGS

The findings of this study were as follows:

1. Each of the nine groups, with the exception of the filmstrip presented to the medium educational level group, made significant gains in knowledge of the care and prevention of injuries to insensitive feet at or beyond the .05 level of confidence.

2. When the educational media were compared without regard to educational level, no significant differences were found among the booklet, film, and filmstrip as to their effectiveness in disseminating knowledge.

3. When the effect of the educational presentation was compared according to educational level, it was revealed that the high educational level subjects made significantly greater gains in knowledge at the .01 level of confidence, than the medium and low educational level subjects. Secondly, it was found that the medium educational level subjects made
significantly greater gains, at the .05 level of confidence, than the low educational level subjects.

4. The interaction effects were, in general, found to be nonsignificant which indicated uniformity of the effects of the educational media in the presence of the educational levels. However, one interaction effect was found to be significant at the .01 level of confidence. This comparison revealed that the film was more effective with medium educational level subjects than was the filmstrip, but the filmstrip was more effective than the film with low educational level subjects.

III. DISCUSSION

Discussion of the Findings

The findings of this study indicated that, in general, all the educational media were effective in disseminating knowledge of the care and prevention of injuries to insensitive feet to diabetics of different educational levels. However, some qualifications must be made regarding some of the findings to justify this generalization.

The first finding which required discussion concerns the nonsignificant F-ratio found for the analysis of the significance of the mean gains in knowledge for the subjects of medium educational level who viewed the filmstrip. Due to the fact that the filmstrip was found to be effective with subjects of higher and lower educational classifications, it
seemed logical that the filmstrip also would have been effective for the medium educational level group. It was believed that the nonsignificant F-ratio for this group resulted as a chance occurrence, and, in reality, that the filmstrip would be effective for medium educational level subjects.

In view of this, caution should be taken in interpreting the analysis of the data for the subjects of the medium educational level who were shown the filmstrip. These analyses were the three part analysis of variance which demonstrated nonsignificant gains in knowledge, Table VII, and in comparison $A_2B_2$, Table XIV, for the interaction effects of the educational media in the presence of the educational levels. This comparison, in part, demonstrated that the film was more effective than the filmstrip in disseminating knowledge to medium educational level subjects.

The second consideration was the specification that the filmstrip was the most effective audio-visual media for the low educational level subjects. This was indicated in the significant interaction effects found for comparison $A_2B_2$, Table XIV.

Lastly, the finding that the higher the educational level the more effective were the educational media were both a source of satisfaction and concern. These findings serve to validate the educational classifications used in this study and to indicate the benefits of completing as
many years of formal education as possible. On the other hand, the source of concern arises from the fact that the low educational level subjects are perhaps the ones who need information regarding the care of the feet the most.

While, the educational media were found to be effective for the low educational level subjects, especially the book and the filmstrip, it would have been ideal if the educational media had been equally effective for all subjects regardless of educational level. Since this was not found to be true, it could be an indication that the low educational level subjects did not have as high an aptitude for learning as the other subjects. Therefore, the educational media may have been slightly above their ability level. In addition, it could be that there was too much information presented, hence, the meaningfulness of the material was not fully realized.

Subjective Observations

This writer made subjective observations during this study, one of which coincides with a finding of this study. The first observation supports the finding of the effectiveness of the filmstrip as compared to the film for subjects of the low educational level. The film seemed to fail to produce the same viewer reaction as did the filmstrip. Both of these media covered the same material except that the film used cartoon-type illustrations, motion sequences, and a narrator, whereas, the filmstrip used only sixty
cartoon-type illustrations and a tape recorded narration. It was observed that the presentation of the material by the filmstrip appeared to be straightforward and unsophisticated. Conversely, this writer feels that the presence of the narrator in the film acted as a distraction for some of the low educational level subjects.

The second observation is directed toward the effectiveness of the booklet. While this booklet appeared well suited for subjects of a relatively high educational level, it may have been too lengthy and laborious for low educational level subjects to receive its full benefits. The subjects of the higher educational levels seemingly could read the entire booklet and give meaning to each of the chapters without particular reference to an existing problem. It is possible that the booklet, or a part of the booklet in brochure form, might be more effective for the low educational level subjects if it could be given to them at the onset of a specific problem.

**Expressed Need and Significance of the Educational Media**

During this study, additional evidence for the need of these educational media was noted. Many of the diabetics tested voiced complaints about problems they were encountering with regard to the care of their feet. Examples of these problems were poor circulation, insensitivity, and bone absorption.
Pogonowska, Collins, and Dobson\textsuperscript{1} stated that out of 242 diabetic patients selected at random from the Diabetic Clinic, Ben Taub General Hospital, Houston, Texas, thirty-three percent were found to have radiographically detectable abnormalities of the feet. Of this percentage, approximately one out of every five had foot problems classified as "diabetic osteopathy" or deformation and absorption of the feet. It was also stated that such problems are more commonly noted with diabetics than is generally recognized.

In relation to the significance of the educational media, Dobson\textsuperscript{2} stated that patient education is usually given just lip service by physicians and hospitals while little is actually done. He further stated that the educational media on the care and prevention of injuries to insensitive feet used in this study represented a step forward in patient education programs. Moreover, Dobson stated that the educational media have value in clarifying and unifying the thinking of medical and paramedical personnel.

Jensen,\textsuperscript{3} Director of Chronic Illness Division of the Houston City Health Department, said that the educational media would probably act to stimulate discussion among health

\textsuperscript{1}Pogonowska, Collins, and Dobson, \textit{Loc. cit.}, pp. 265-271.

\textsuperscript{2}Interview with Harold Dobson, \textit{Loc. cit.}

\textsuperscript{3}Personal Interview with Francine Jensen, M. D., Director of Chronic Illness Division, Houston, Texas, June 13, 1968.
service personnel concerning problems associated with insensitivity of the feet. Likewise, it would serve to alert attention to prevention as well as to treatment.

IV. CONCLUSIONS

Within the limits of this study the following conclusions were justified:
1. The booklet, film, and filmstrip are equally effective in disseminating knowledge of the care and prevention of injuries to insensitive feet.
2. The educational media are more effective the higher the educational level of the learner.
3. When the learners are classified according to educational level the booklet, film, and filmstrip are, in general, equally effective. An exception to this possibly exists for low educational level learners; in this case, the most effective audio-visual medium appears to be the filmstrip.

V. RECOMMENDATIONS FOR FURTHER STUDY

On the basis of this study, recommendations for further study were made as follows:
1. That a study be conducted after an educational program has been presented to determine the extent to which the knowledge of the care and prevention of injuries to insensitive feet is retained after an extended noneducational period.
2. That a study be conducted after an educational program has been presented to determine the application of the
knowledge of the care and prevention of injuries to insensitive feet, as evidenced by a reduction in the amount of medical care required specifically for the feet.

3. That a study be conducted to determine the effectiveness of a multi-media approach, combining the booklet with an audio-visual medium, as compared to a single medium presentation of the same length in disseminating knowledge of the care and prevention of injuries to insensitive feet.

4. That the effectiveness of parts of the booklet be compared to the use of brochures in disseminating knowledge of the care and prevention of injuries to insensitive feet to people classified as having a low educational level.
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SELECTED BIBLIOGRAPHY

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C. UNPUBLISHED MATERIAL


D. OTHER SOURCES


City Health Department. Personal Interview with Francine Jensen, M. D., Director of Chronic Illness Division, Houston, Texas. June 13, 1968.

APPENDICES
APPENDIX A

NAME __________________________________________

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CITY __________________________________________

AGE: ___  SEX: M _ F _

TEST INSTRUCTIONS

THE PURPOSE OF THIS TEST IS TO DETERMINE YOUR KNOWLEDGE CONCERNING THE CARE AND PREVENTION OF INJURIES TO INSENSITIVE FEET. INSENSITIVE FEET ARE FEET THAT CANNOT FEEL PAIN.

TWENTY-FIVE MULTIPLE CHOICE QUESTIONS MAKE UP THIS TEST. YOU ARE TO MARK ALL OF THE TRUE STATEMENTS IN EACH QUESTION. ONE OR MORE OF THE STATEMENTS MAY BE TRUE. YOU ARE TO MARK THE STATEMENTS YOU THINK ARE TRUE BY PLACING A CHECK MARK (✓) IN THE SPACE PROVIDED TO THE LEFT OF EACH STATEMENT.

TRY THIS SAMPLE QUESTION FOR PRACTICE:

MANY PEOPLE LIVE IN CITIES. CHECK THE STATEMENTS THAT ARE TRUE.

__ A) HOUSTON IS THE NAME OF A CITY.
__ B) LOUISIANA IS THE NAME OF A CITY.
__ C) THE UNITED STATES OF AMERICA IS THE NAME OF A CITY.
__ D) BATON ROUGE IS THE NAME OF A CITY.

CORRECT ANSWERS: ✓ A)
✓ D)
1. THE SKIN OF THE FOOT HAS CERTAIN FUNCTIONS OR JOBS TO DO. LISTED BELOW ARE FOUR POSSIBLE FUNCTIONS OF THE SKIN. CHECK THE FUNCTIONS THAT ARE TRUE.

___ A) THE SKIN IS A FRAMEWORK TO HELP SUPPORT THE BODY.
___ B) THE SKIN KEEPS THE GERMS OUT OF THE FOOT.
___ C) HEALTHY SKIN KEEPS THE FOOT FROM BECOMING ABSORBED.
___ D) THE SKIN HOLDS THE NERVE ENDINGS.
2. INJURIES TO INSENSITIVE FEET CAN BE A PROBLEM. CHECK THE STATEMENTS THAT ARE TRUE.

A) CONTINUED WALKING ON A MINOR BRUISE WILL CAUSE THE SKIN TO BREAK.

B) A CUT IN THE SKIN OF THE FOOT WILL LET GERMS INTO THE FOOT.

C) A CUT IN THE SKIN OF THE FOOT WILL LEAD TO AN INFECTION.

D) A CUT IN THE SKIN OF THE FOOT CAN LEAD TO BONE ABSORPTION.
3. The soft tissue which lies between the skin and the bones is an important part of the feet. Check the statements that are true.

- **A)** When the soft tissue is healthy, it acts like a cushion between the skin and bones.
- **B)** When the soft tissue becomes hard, it increases the protection between the skin and bones.
- **C)** When the soft tissue is scarred or damaged, it is like walking on pillows.
- **D)** When the soft tissue is healthy, it is safe to run with long strides.
4. BONES AND MUSCLES ARE TWO PARTS OF THE FOOT. BOTH OF THESE PARTS HAVE IMPORTANT JOBS TO DO. CHECK THE STATEMENTS THAT ARE TRUE.

A) MOVING OF AN INJURED BONE IS NECESSARY FOR HEALING.

B) WHEN AN ABSORBED FOOT IS GIVEN MEDICAL CARE, THE BONES WILL GROW BACK TO NORMAL SIZE.

C) VOLUNTARY MUSCLES ARE USED PRIMARILY TO MOVE THE FOOT.

5. When you find a blister on your foot, you should know what to do. Check the statements that are true.

A) A blister does not need to be rested or immobilized until it breaks open.

B) A blister should be rested or immobilized as soon as it is found to prevent it from becoming worse.

C) Frequent inspection of the shoes for looseness will help to prevent getting blisters on the feet.

D) Continued walking on a small blister is recommended because the skin will become tough and prevent further damage to the foot.
6. CHECK THE STATEMENTS THAT ARE TRUE REGARDING CARE OF INSENSITIVE FEET.

__ A) YOU SHOULD INSPECT YOUR FEET FOR RED AREAS.

__ B) YOU SHOULD INSPECT YOUR FEET FOR DEEP BRUISES.

__ C) YOU SHOULD INSPECT YOUR SHOES FOR WET SPOTS.

__ D) YOU SHOULD INSPECT YOUR SOCKS FOR WET SPOTS.
7. Listed below are four areas of the bottom of the foot where bruises could be found by pressure inspection. Check the statements that are true.

A) Always inspect area 1 for deep bruises.

B) Always inspect area 2 for deep bruises.

C) Always inspect area 3 for deep bruises.

D) Always inspect area 4 for deep bruises.
8. CHECK THE STATEMENTS THAT ARE TRUE WITH REGARD TO FINDING DEEP BRUISES.

__ A) YOU CAN FIND DEEP BRUISES BY PRESSING HARD ON THE BOTTOM OF THE FEET.

__ B) YOU CAN FIND SOME DEEP BRUISES BY LOOKING FOR REDNESS ON THE BOTTOM OF THE FEET.

__ C) YOU CAN FIND SOME DEEP BRUISES BY LOOKING FOR SWELLING, PUFFINESS, ON THE BOTTOM OF THE FEET.

__ D) ALL DEEP BRUISES WILL HAVE BOTH DISCOLORATION AND SWELLING.
9. THE PICTURE BELOW SHOWS THE FOOT OF A BOY WHO STEPPED ON A NAIL WHILE WALKING BAREFOOTED AND DID NOT KNOW IT. CHECK THE STATEMENTS THAT ARE TRUE.

___ A) HE DOES NOT FEEL PAIN BECAUSE THE NAIL IS STICKING IN A BONE.
___ B) HE DOES NOT FEEL PAIN BECAUSE HIS MUSCLES ARE NOT WORKING.
___ C) HE DOES NOT FEEL PAIN BECAUSE HIS NERVES ARE NOT WORKING.
___ D) HE DOES NOT FEEL PAIN BECAUSE HIS SKIN AND SOFT TISSUE HAVE BECOME HARD.
10.Insensitive feet, feet that do not feel pain, can be injured in many ways. Listed below are possible ways to injure the feet. Check the statements that are true.

- A) Stepping on sharp objects will puncture the skin.

- B) Wearing tight shoes that stop the blood flow can injure the feet.

- C) Jumping can bruise the feet.

- D) Nails or sharp objects inside of shoes can injure the feet.
11. A BUISE IS ONE OF THE COMMON INJURIES TO INSENSITIVE FEET. CHECK THE STATEMENTS THAT ARE TRUE.

- A) BRUISES ARE MINOR INJURIES AND CAN CAUSE ONLY SLIGHT DAMAGE TO INSENSITIVE FEET.

- B) A DEEP BRUISE IS EASIER TO FIND THAN A BLISTER.

- C) STEPPING ON A HARD OBJECT CAN CAUSE A BRUISE.

- D) A BRUISE DAMAGES THE SOFT TISSUE WHICH WILL INCREASE THE CHANCE OF FURTHER INJURY.
12. BLISTERS WILL USUALLY APPEAR ON CERTAIN AREAS OF THE FOOT WHEN WEARING SHOES THAT DO NOT FIT PROPERLY. CHECK THE STATEMENTS THAT ARE TRUE.

- A) BLISTERS CAUSED BY IMPROPERLY FITTED SHOES WILL USUALLY BE FOUND ON THE HEELS OF THE FEET.

- B) BLISTERS CAUSED BY IMPROPERLY FITTED SHOES WILL USUALLY BE FOUND ON THE SIDES OF THE FEET.

- C) BLISTERS CAUSED BY IMPROPERLY FITTED SHOES WILL USUALLY BE FOUND ON THE BOTTOM OF THE FEET.

- D) BLISTERS CAUSED BY IMPROPERLY FITTED SHOES WILL USUALLY BE FOUND ON THE TOP OF THE TOES OF THE FEET.
13. IF YOU CANNOT TURN YOUR FEET OVER TO INSPECT THEM, THERE ARE OTHER PRACTICAL WAYS TO LOOK AT THE BOTTOM OF YOUR FEET. CHECK THE STATEMENTS THAT ARE TRUE.

A) USE A MIRROR TO INSPECT THE BOTTOM OF YOUR FEET.

B) HAVE A FRIEND INSPECT THE BOTTOM OF YOUR FEET EVERY DAY.

C) GO TO THE DOCTOR EVERY DAY TO HAVE HIM INSPECT THE BOTTOM OF YOUR FEET.

D) WAIT UNTIL THE INJURY CAN BE SEEN FROM THE TOP OR SIDES BEFORE YOU INSPECT THE BOTTOM OF YOUR FEET.
14. LISTED BELOW ARE FOUR STATEMENTS DESCRIBING HOW OFTEN THE FEET SHOULD BE INSPECTED. CHECK THE STATEMENTS THAT ARE TRUE.

   ---A) INSPECTING INSENSITIVE FEET ONCE A DAY IS NORMALLY SUFFICIENT.

   ---B) INSPECTING INSENSITIVE FEET ONCE A WEEK IS NORMALLY SUFFICIENT.

   ---C) INSPECTING INSENSITIVE FEET EVERY TWO HOURS WHEN WEARING NEW SHOES IS NECESSARY.

   ---D) INSPECTING INSENSITIVE FEET ONCE A DAY WHEN WEARING NEW SHOES IS SUFFICIENT.
15. KNOWING WHAT TO DO WHEN SOMETHING HAPPENS TO YOUR FEET IS IMPORTANT. YOU SHOULD KNOW WHAT TO DO IF A BRICK FALLS ON YOUR FOOT WHILE WEARING SHOES. CHECK THE STATEMENTS THAT ARE TRUE.

A) DO NOT WORRY BECAUSE SHOES PREVENT INJURIES FROM HAPPENING TO THE FEET.
B) STOP AND INSPECT YOUR FOOT AT ONCE TO SEE IF IT IS INJURED.
C) CHECK FOR A BRUISE OR SWELLING LATER IN THE DAY.
D) IF THERE IS SWELLING, IT IS SAFE TO CONTINUE WALKING PROVIDED THAT THE FOOT IS BANDAGED.
16. IT IS IMPORTANT THAT YOU KNOW HOW TO CARE FOR AN INJURED FOOT SO YOU CAN WALK ON IT WITHOUT CAUSING FURTHER DAMAGE TO THE INJURY. CHECK THE STATEMENTS THAT ARE TRUE.

___ A) IT IS SAFE TO WALK WITH AN INJURED FOOT THAT HAS A CLEAN BANDAGE ON IT.

___ B) IT IS SAFE TO WALK WITH AN INJURED FOOT WHEN IT HAS A THICK BANDAGE AND IS PUT INTO A SHOE.

___ C) IT IS SAFE TO WALK WITH AN INJURED FOOT IF YOU USE CRUTCHES AND NEVER LET THE INJURED FOOT TOUCH THE FLOOR.

___ D) IT IS SAFE TO WALK WITH AN INJURED FOOT IF YOU HAVE IT IN A ROCKER CAST.
17. WAYS TO REST AN INJURY ARE: BED AND CHAIR CONFINEMENT. IF THESE METHODS ARE USED, CERTAIN PROCEDURES MUST BE FOLLOWED. CHECK THE STATEMENTS THAT ARE TRUE.

___ A) AN OCCASIONAL SHORT WALK, SUCH AS TO THE BATHROOM, WILL NOT CAUSE DAMAGE TO THE INJURED FOOT.

___ B) IF YOU DO HAVE TO MOVE FROM ONE ROOM TO ANOTHER YOU SHOULD PUT A CLEAN BANDAGE AND SHOE ON THE INJURED FOOT.

___ C) IT IS SAFE TO GET UP AND WALK WITH CRUTCHES IF YOU NEVER LET THE INJURED FOOT TOUCH THE FLOOR.

___ D) AS LITTLE PRESSURE AS POSSIBLE SHOULD BE APPLIED TO THE INJURED PART OF THE FOOT.
18. People with insensitive feet, feet that do not feel pain, must pay particular attention to the way they walk. Check the statements that are true.

A) You should walk taking big steps; this way your body weight is on your feet for a short length of time.

B) You should walk taking little steps. This spreads your body weight over more of the feet.

C) You should try to walk barefooted as much as possible to toughen the skin of the feet for better protection.

D) You should always wear shoes while walking for greatest protection of the feet.
19. THE WAY YOU WALK IS IMPORTANT IN PREVENTING INJURIES TO INSENSITIVE FEET. CHECK THE STATEMENTS THAT ARE TRUE.

___ A) THE SLOW WALK IS SAFE BECAUSE THE ENTIRE FOOT SHARES THE BODY WEIGHT.

___ B) MORE SOFT TISSUE IS USED IN PROTECTING THE FOOT IN THE FAST WALK THAN IN THE SLOW WALK.

___ C) THE SLOW WALK IS MORE APT TO CAUSE BLISTERS BECAUSE THE BODY WEIGHT IS ON THE FEET LONGER.

___ D) WHEN YOU WALK FAST, THE PRESSURE OR FORCE OF THE BODY WEIGHT IS MORE EVENLY DISTRIBUTED OVER THE FOOT.
20. There are certain things that people with insensitive feet should know about walking and running. Check the statements that are true.

A) You should stop for rests if you have to walk for a long distance.
B) You should take a long walk daily in order to toughen your feet.
C) You should run a little each day to make your feet strong.
D) You should watch where you walk because you can hurt your feet easier than a person with normal feet.
21. PEOPLE WITH INSENSITIVE FEET SHOULD BE CAREFUL TO BUY SHOES THAT WILL NOT INJURE THEIR FEET. THERE ARE CERTAIN RULES THAT MUST BE FOLLOWED TO HELP YOU BUY SHOES THAT FIT PROPERLY AND WILL NOT CAUSE INJURIES. CHECK THE STATEMENTS THAT ARE TRUE.

A) BUY SHOES THAT HAVE GLUED-ON HEELS TO AVOID INJURIES TO THE FEET.

B) BUY SHOES WITH NAILED-ON HEELS BECAUSE THEY LAST LONGER.

C) NARROW, TIGHT-FITTING SHOES ARE DANGEROUS.

D) BUY SHOES THAT ARE LOOSE AT THE HEEL, AS THIS PREVENTS BLISTERS.
22. When buying new shoes you must be careful to select shoes that will not injure your feet. Check the statements that are true.

_A) People with insensitive feet should inspect new shoes for shortness at the toe._

_B) People with insensitive feet should inspect new shoes for narrowness on the sides._

_C) People with insensitive feet can buy any kind of shoes without worrying about injuring their feet._

_D) Holes in the heel are a sign that the shoe has a glued-on heel._
23. One of the problems with insensitive feet is absorption. The loss of or growing together of the bones and the shrinking of the soft tissue and skin. Check the statements that are true.

- A) All insensitive feet will have some absorption in time.
- B) In most cases, absorption of insensitive feet can be prevented.
- C) Absorption of the feet may result when the feet are continuously damaged over a period of time.
- D) When an injury becomes infected, it is too late to do anything to keep it from becoming absorbed.
24. ABSORBED FEET ARE DIFFERENT FROM NORMAL FEET. CHECK THE STATEMENTS THAT ARE TRUE.

A) ABSORBED FEET REQUIRE LESS CARE BECAUSE THEY ARE SMALLER THAN NORMAL FEET.

B) ABSORBED FEET GIVE LESS SUPPORT BECAUSE THEY HAVE FEWER BONES THAN NORMAL FEET.

C) IT IS EASIER TO DAMAGE THE SKIN OF AN ABSORBED FOOT THAN A NORMAL FOOT.

D) ABSORBED FEET HAVE HARDER SKIN AND SOFT TISSUE THAN NORMAL FEET.
25. LEARNING HOW TO KEEP YOUR FEET HEALTHY IS VERY IMPORTANT. PEOPLE WITH INSENSITIVE FEET, FEET THAT DO NOT FEEL PAIN, MUST GIVE THEIR FEET SPECIAL ATTENTION. CHECK THE STATEMENTS THAT ARE TRUE.

A) PEOPLE WITH INSENSITIVE FEET SHOULD WALK DIFFERENTLY THAN PEOPLE WITH NORMAL FEET.

B) GIVE AN INJURED FOOT IMMEDIATE CARE TO HELP IT GET BETTER.

C) SHOES THAT ARE TOO TIGHT CAN STOP THE BLOOD FLOW TO THE FEET AND THIS WILL KILL AREAS OF THE SKIN.

D) DOCTORS ARE THE ONLY ONES WHO SHOULD INSPECT YOUR FEET FOR INJURIES.
THE NEXT QUESTION WILL NOT BE GRADED. IT IS FOR INFORMATION AND WILL BE SEEN ONLY BY THE TESTER.

CHECK THE ONE STATEMENT THAT BEST DESCRIBES THE HIGHEST GRADE LEVEL IN SCHOOL WHICH YOU HAVE COMPLETED.

___ A) I HAVE COMPLETED THE 3rd GRADE.
___ B) I HAVE COMPLETED THE 6th GRADE.
___ C) I HAVE COMPLETED THE 9th GRADE.
___ D) I HAVE COMPLETED THE 12th GRADE.
TRUE ANSWERS

1. B, D
2. A, B, C, D
3. A
4. C, D
5. B, C
6. A, B, C, D
7. A, B, C, D
8. A, B, C
9. C
10. A, B, C, D
11. C, D
12. A, D
13. A, B
14. A, C
15. B, C
16. C, D
17. C, D
18. B, D
19. A
20. A, D
21. A, C
22. A, B
23. B, C
24. B, C, D
25. A, B, C
APPENDIX B

OUTLINE OF THE PROCEDURE
OF THIS STUDY

I. Overview

II. Pre-testing
   1. Explanation of the test instructions
   2. Administration of the test

III. Grouping the Subjects (Only when testing the Lay Society)
   1. Instructions given prior to grouping
   2. Grouping of the subjects

IV. Educational Period
   1. Explanation of educational presentation
   2. Commencement of educational presentation
   3. Rest period
   4. Termination of rest period and continuation of the educational period
   5. Termination of the educational period

V. Post-testing
   1. Instructions
   2. Administration of the test
   3. Collection of testing materials and dismissal of the subjects

97
INSTRUCTIONS GIVEN TO THE SUBJECTS

Overview

The purpose of this meeting is to evaluate the effectiveness of different educational media in disseminating knowledge of the care and prevention of injuries to insensitive feet. Insensitive feet are feet that cannot feel pain and can be a serious problem for people with diabetes.

You will be asked to take a short multiple-choice test; next you will read a cartoon style booklet or view an audio-visual presentation; and then you will retake the test. The test appears to be rather long; however, this is because each of the twenty-five multiple-choice questions is printed on a separate page.

Your cooperation and sincere effort will assist us to learn how to better educate thousands of people in the care and prevention of injuries to their insensitive feet. You will now be given exact instructions concerning the test.

Pre-Testing

You will now be provided with a test booklet and a pencil. When you receive the test booklet, please sign your name in the space provided, last name first, and the name of
the city in which this test is being given. The test instructions will be read aloud and you are to read them silently at the same time. A sample test question is included in these instructions, and you are to respond to this question as directed. After the instructions have been read, you will have an opportunity to ask questions about how to take the test. Now read the instructions silently as I read them aloud.

Are there any questions?

Remember, mark only the true statements, and that one or more of the statements may be true. When you finish the test, stay in your seat and remain quiet until you are given further directions. Now, please open your test booklet to the first question and begin the test.

Grouping the Subjects

Now that everyone has finished the test, we will begin the educational portion of this meeting. In order to do this, each of you will be assigned to an educational group.

In the upper right hand corner of your test booklet there is a red number. This number will range from one to three and designates the educational group to which you have been assigned. In a moment, you will be directed to report to a room for your educational presentation. As you leave this room you are to turn your test booklet and pencil into
the person at the door. When you get to the assigned room, please sit and remain quiet. Please do not talk to anyone about the test you have just finished.

Will the people who have a red number one in the upper right hand corner of their test booklet, please raise your right hand. You are to report to room (indicate room). Mr., Mrs. (indicate name) will be your proctor during the educational presentation. Now will those people having a red number one in the upper right hand corner of your test booklet, rise, turn your paper and pencil into the person by the door and follow Mr., Mrs. (indicate name) to room (indicate number).

Will the people who have a red number two in the upper right hand corner of their test booklet, please raise your right hand. You are to report to room (indicate room). Mr., Mrs. (indicate name) will be your proctor during the educational presentation. Now will those people having a red number two in the upper right hand corner of your test booklet, rise, turn your paper and pencil into the person by the door and follow Mr., Mrs. (indicate name) to room (indicate number).

Will the remaining people please check the number on your test booklet to see that a red number three appears in the upper right hand corner of your test booklet. You will be given your educational presentation in this room. Would you please pass your test booklets to the right end
or your row and then toward the front of the room. If you would like you may now stand or move to a chair in the front of the room.

**Educational Presentations**

Please find a chair and remain quiet. You are not to talk to each other or ask any questions. This educational period will last twenty-six minutes.

**Group A.**—You will be given a cartoon booklet entitled *The Care and Prevention of Injuries to Insensitive Feet*. You are to read and study this booklet for the entire educational period. You are to study the booklet at your own pace; however, it is hoped that you will be able to read the booklet twice. Please begin reading the booklet and be sure to begin on the inside cover. You may now begin studying the booklet. Please pay careful attention.

**Group B.**—You will be shown the film, *The Sensible Seven*, two times. The film will now be shown to you for the first time. Please pay careful attention.

**Group C.**—You will be shown the filmstrip, *The Care and Prevention of Injuries to Insensitive Feet*, two times. The filmstrip will be shown to you now for the first time. Please pay careful attention.

**Rest Period**

A rest period will now begin. You may stand by your chair, but you are not to talk to anyone. This rest period
will last for two minutes. You will be told when one minute remains in the rest period, and you should be in your chair when the rest period is ended.

The rest period is now over. Please return to your seat so the educational presentation can resume.

Termination of the Educational Period

The educational period has ended. You are now to report directly to the room used for the initial testing session. Do not talk to anyone about the educational presentation. When you arrive in that room please sit and remain quiet.

Post-Testing

You will now retake the multiple-choice test. You will be given a test booklet and a pencil. There are two additions to this test. First, under the space provided for your name, you will be asked to indicate your age and sex. The second addition is a question concerning the educational level in school which you have completed. Your answers to these items will be used in the experimental analysis of the test and will be held confidential.

If you have not already done so, sign your name, last name first, and the name of the city where this test is being given. Also mark your age in years and your sex by placing a check mark by M for male or F for female.
I will now read the test instructions aloud as you read them silently. After this has been done, you will be allowed to ask questions regarding how to take the test.

Are there any questions?

When you finish the test, please wait quietly in your seat until everyone has finished and all materials have been collected. You may now open your test booklet to the question and begin the test.

Collection of Testing Materials and Dismissal of the Subjects

Now that everyone has finished the test, will you please pass the test booklets and pencils to the right hand end of your row where they will be collected. Your cooperation in this experiment has been appreciated, and it is hoped that you have learned how to better care for and protect your feet.
APPENDIX D

INSTRUCTION GIVEN TO THE PROCTORS

It will be your responsibilities to guide the subjects to the room to be used for the educational presentation, to operate the necessary projection equipment, and to see that the subjects do not discuss the test or the educational presentation. It is your duty to act as a proctor and not as an educator. Please do not answer any questions about the presentation but direct the subjects attention to the educational presentation.
APPENDIX E

AGE AND ACHIEVEMENT TEST SCORES
FOR THE 135 SUBJECTS USED
IN THIS STUDY

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Group H, Instruction by Film, Low Educational Level

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Group I, Instruction by Filmstrip, Low Educational Level

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VITA

Stephen Edward Klesius, the son of Phillip M. and Mary H. Klesius, was born in Bryn Mawr, Pennsylvania on November 22, 1940. In 1946 the family moved to St. Petersburg, Florida.

Stephen Klesius attended public school in St. Petersburg and graduated from Boca Ciega High School in 1958. In September of that same year he entered Florida State University. He earned the Bachelor of Science Degree in 1962, with a major in physical education, and was employed as a driver education and physical education teacher and coach at Chamberlain High School, Tampa, Florida. After three years of teaching he returned to Florida State University and earned his Masters of Science degree in physical education. Next, he began his doctoral program at Louisiana State University in September, 1966. During that school year he served as a graduate assistant with teaching responsibilities in the basic program. The following year he was appointed as a Special Lecturer with research duties associated with a Rehabilitation Service Administration grant. The Doctor of Philosophy with a major in physical education and a minor in psychology was awarded the second of August, 1968.
Stephen Klesius is married to the former Janell J. Putnal of Mayo, Florida. They have two sons, Gregory and Douglas.
EXAMINATION AND THESIS REPORT

Candidate: Stephen Edward Klesius

Major Field: Physical Education

Title of Thesis: The Effectiveness of Selected Educational Media in Disseminating Knowledge of the Care and Prevention of Injuries to Insensitive Feet to Diabetics of Different Educational Levels

Approved:

Francis A. Drury
Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

Jack K. Nelson

David A. Yang

Elizabeth Moore

Evelyn S. Clarke

Date of Examination:

July 15, 1968