CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

A STUDY TO DETERMINE THE
EFFECTIVENESS OF SLIDE-TAPE PROGRAMS
FOR HEALTH EDUCATION

A thesis submitted in partial satisfaction of the requirements for the degree of

Master of Public Health

by

Ramakrishna S. Ram

January 1985
The Thesis of Ramakrishna S. Ram is approved:

Liucija Baskauskas, Ph. D.

Date

Michael V. Kline, Dr. P. H.

Date

Goteti B. Krishnamurty, Dr. P. H., Chair

Date

California State University, Northridge

ii
ACKNOWLEDGEMENTS

The author wishes to acknowledge the following individuals for their contributions to this project: Dr. Krishnamurty, for his guidance and encouragement throughout the project, and Dr. Baskauskas and Dr. Kline, for their valuable suggestions.

The author is grateful to late Dr. Beharry, Director of the Student Health Center of California State University, Northridge, for allowing this study to be conducted at the Center. A special thanks is in order here for Dr. Vashiastha and Agnes Kratzer, R.N., for their valuable suggestions in the designing of the media program and in conducting this study.

The author wishes to express his gratitude and appreciation to his wife, Jeri Weiss Ram, for editing this document.

Finally, a note of thanks to all the foreign students that participated in the testing process, giving their valuable time to this project and making it a success.
# TABLE OF CONTENTS

ACKNOWLEDGEMENTS ........................................ iii

LIST OF TABLES .............................................. v

LIST OF FIGURES ............................................. v

ABSTRACT ....................................................... vi

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>I INTRODUCTION .................................... 1</td>
</tr>
<tr>
<td></td>
<td>Statement of the Problem .......................... 4</td>
</tr>
<tr>
<td></td>
<td>Purpose of the Study .............................. 4</td>
</tr>
<tr>
<td></td>
<td>Limitations of the Study ......................... 4</td>
</tr>
<tr>
<td>II</td>
<td>REVIEW OF LITERATURE ................................ 5</td>
</tr>
<tr>
<td></td>
<td>Introduction ....................................... 5</td>
</tr>
<tr>
<td></td>
<td>Origins of Slide-Tape Programs .................... 5</td>
</tr>
<tr>
<td></td>
<td>Learning Theories .................................. 9</td>
</tr>
<tr>
<td></td>
<td>Research Findings on the Use of ................. 15</td>
</tr>
<tr>
<td></td>
<td>Visual and Audio Media for Education ................</td>
</tr>
<tr>
<td></td>
<td>Characteristics of Slide-Tape Programs ........... 18</td>
</tr>
<tr>
<td></td>
<td>Tuberculosis Disease ................................ 23</td>
</tr>
<tr>
<td></td>
<td>Summary ........................................... 26</td>
</tr>
<tr>
<td>III</td>
<td>METHODS ............................................ 28</td>
</tr>
<tr>
<td></td>
<td>Designing the Instructional ....................... 28</td>
</tr>
<tr>
<td></td>
<td>Media Program ..................................... 28</td>
</tr>
<tr>
<td></td>
<td>Production of the Slide-Tape Program ............. 34</td>
</tr>
<tr>
<td></td>
<td>Selection of the Population ....................... 34</td>
</tr>
<tr>
<td></td>
<td>Testing Procedure and Evaluation ................. 35</td>
</tr>
<tr>
<td>IV</td>
<td>RESULTS ............................................ 38</td>
</tr>
<tr>
<td></td>
<td>Data Analysis ...................................... 39</td>
</tr>
<tr>
<td></td>
<td>Subjective Observations .......................... 43</td>
</tr>
<tr>
<td>V</td>
<td>SUMMARY AND CONCLUSIONS ............................ 46</td>
</tr>
<tr>
<td></td>
<td>Summary .......................................... 46</td>
</tr>
<tr>
<td></td>
<td>Conclusions ....................................... 49</td>
</tr>
</tbody>
</table>

BIBLIOGRAPHY ................................................ 50

APPENDIX ..................................................... 51
|          | Slide-Tape Program Script ......................... 54 |
|          | Sample Storyboard .................................. 64 |
|          | Pre and Post Test .................................. 66 |
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tuberculosis Cases</td>
<td>2</td>
</tr>
<tr>
<td>2. Instructional Media Stimulus Relationship to Learning Objectives</td>
<td>19</td>
</tr>
<tr>
<td>3. Effectiveness of Slide-Tape Programs</td>
<td>20</td>
</tr>
<tr>
<td>4. Number of Students Answering Questions Correctly in the Pretest in Both Groups</td>
<td>39</td>
</tr>
<tr>
<td>5. Comparison of Pretest Scores</td>
<td>40</td>
</tr>
<tr>
<td>6. Percentage of Students That Achieved the Behavioral Objectives in Both Groups During Pretest and Posttest</td>
<td>41</td>
</tr>
<tr>
<td>7. Comparison of Mean Pretest and Posttest Scores</td>
<td>42</td>
</tr>
<tr>
<td>8. Comparison of Difference Between the Pretest and Posttest Scores</td>
<td>43</td>
</tr>
</tbody>
</table>

LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Media Production Model</td>
<td>30</td>
</tr>
<tr>
<td>2. Individual Try-Out Process</td>
<td>32</td>
</tr>
</tbody>
</table>
ABSTRACT

A STUDY TO DETERMINE THE
EFFECTIVENESS OF SLIDE-TAPE PROGRAMS
FOR HEALTH EDUCATION.

by

Ramakrishna S. Ram
Master of Public Health

The goal of this study was to create a slide-tape program and evaluate its effectiveness as a tool for health education. The topic selected for the slide-tape program was tuberculosis education.

The content of the slide-tape program was designed to promote positive preventive health action. The information in the slide-tape program included transmission of tuberculosis, symptoms of the disease, and preventive action that should be taken to stop the disease.

The population selected for this study was foreign students attending an university and was represented by 34
students in Group I and 37 students in Group II. Formative testing of the slide-tape program was conducted at three stages with members of the target population. Appropriate corrections were made at each stage.

Group testing was conducted with Group I (n=34) viewing the slide-tape program and Group II (n=37) attending a lecture on tuberculosis. The mean pretest scores of groups I and II were 4.72 and 4.68; while the posttest scores were 5.85 and 5.77, respectively.

Upon conducting data analysis it was concluded that the learning in both groups was equal and that there was no statistical difference in learning between the two groups.

The slide-tape program is currently used at the university for tuberculosis education for both foreign and native students.

It was suggested that further studies should be conducted to determine the most effective formative testing protocol in designing health education media. The study of motivational aspects of this media and other media would be of value.
Chapter I

INTRODUCTION

The use of slide-tape programs in education is not new. In fact, if photographic slides and pre-recorded audio material are considered separately, the time period is much longer and goes back to the turn of the century. In recent times slide-tape programs have been used in formal educational settings and for public education on a variety of topics. These programs have been used for health education to a lesser extent. However, studies have been conducted to determine the effectiveness of educational media programs in medical and patient education. (14) (13) Some examples of these studies are discussed in the literature review. From this review this researcher concluded that slide-tape programs are effective in education, but their effectiveness in health education is yet to be determined. In order to test the feasibility of using slide-tape programs for health education, a program on tuberculosis (TB) education was produced.

According to Grzybowski at least 3 million people die from TB in the world each year and about 4 to 5 million new cases of smear-positives develop each year. (23) Even
though the TB problem is not of such a great proportion in the Los Angeles County, it is evident from the number of reported cases of the disease in past few years that TB is a serious medical problem. In 1983, Los Angeles County had 1,488 cases of TB out of 3,459 reported cases in California, which is 43% of the State's total TB cases. In the past few years there has been a downward trend in the number of cases in the Country and State (See Table-1), but there has been no such decrease in

Table - 1

<table>
<thead>
<tr>
<th>Tuberculosis Cases</th>
<th>Number of Cases Per 100,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles County</td>
<td>25.5</td>
</tr>
<tr>
<td>California</td>
<td>18.1</td>
</tr>
<tr>
<td>United States</td>
<td>12.3</td>
</tr>
</tbody>
</table>

(15,7) (15,7) (16,8) (16,9) (17,10)

Note: Figures presented in this table were calculated from the data obtained from the following sources: (a) for Los Angeles County from the Public Health Letter, (b) for California and United States from the Morbidity and Mortality Weekly Reports.

* The data for presented for this year is as follows: For Los Angeles County up to July, 1984. For California and the United States up to September, 1984. Los Angeles County.
According to a survey conducted by the Center for Disease Control, there was an increase in the number of reported cases in the country during 1979 and 1980 due to the arrival of large numbers of refugees from Indochina. (7) The high incidence rate in Los Angeles County may be attributed to the fact that many of these refugees settled in this County.

Rosenstock predicts that for individuals to adopt preventive health behavior, they should have knowledge about the susceptibility and severity of the disease and the benefits of preventive action. (37) Based on these principles, this TB education program hopes to increase awareness, promote change in attitudes, and finally bring about a behavior change such that individuals that are at risk will be more likely to follow an appropriate medical regimen.

The California State University at Northridge (CSUN) is a large university with a student population of more than 28,000. The university has a sizable foreign student population. Many of these students are natives of countries that have very high incidence rates of TB. For example, according to Grzybowski the incidence rates are 328 per 100,000 in Philippines and 196 per 100,000 in Hong Kong. (23) Therefore, every semester each new foreign student who enrolls in the University is given a tuberculin skintest as a routine preventive health measure. Students that have a positive skin test are
required to attend a lecture designed to give information on the disease and the preventive actions that should be taken. These lectures are usually given by a physician or a public health nurse. After attending the lecture, students that choose to undergo appropriate medical treatment receive additional information and counseling on an individual basis. The slide-tape program designed for this study would give the same information as the lecture.

Objective of the Study

The objective is to determine the effectiveness of slide-tape programs for transmission of health education knowledge.

Purpose of the Study

The purpose of this project was to design, produce, and test a slide-tape program on TB that would be used to educate individuals that have been tested positive with the TB skin test.

Limitations of the Project

The fact that the program was tested with foreign students at an university, may preclude the application of these findings to other population groups and situations. Longitudinal retention of knowledge and whether the individuals in the test groups sought preventive health care were not tested.
Chapter II

REVIEW OF LITERATURE

INTRODUCTION

This chapter will describe the development of the use of slides, audio tape, and slide-tape programs for education and instruction. The applications of learning theories to the designing of instructional media will be explored. Slide-tape programs that have been used in a variety of educational settings will be described along with research findings on their effectiveness.

The second section of this chapter will consist of a description of the TB disease from its onset and methods of controlling the disease.

ORIGINS OF SLIDE-TAPE PROGRAMS

Development of Photographic Slides:

Photographic slides have been used in education for more than seventy five years. The first use of "lantern slides" or photographic slides for education can be traced to the Keystone View Company. In 1906 this company produced and distributed the "Keystone 600 Set", a set of lantern slides and stereographs designed for educational use. The company also published a monograph entitled "Visual Education" which was a teacher's guide to the 600 Set. This book introduced the term "visual education" and
"visual instruction" to the educational taxonomy.

In the early twentieth century the science of photography was being rapidly developed. (20) At this stage in the development of photography, the technology and the process of photography was quite complicated. Therefore it was difficult for teachers and instructional media designers to produce instructional program that included photographs without the assistance of professional photographers. Further, financial resources required to produce such materials were quite high; consequently, the production of photographic slides for instructional use was left to large school districts, state education departments, and some innovative companies such as Keystone.

By the late 40's major developments in photography such as the use of celluloid film for still photography rather than glass plates; introduction of color film; reduction in the size of cameras; and the availability of commercial processing of film; made it possible for some amateurs photographers to produce their own slides. (26)

It was during the early 60's when there was a major push in the American schools to improve the teaching of science and math that there was wide spread use of slides and audio tape for instruction. It was also during this time period that the technology for synchronizing slides to an audio tape was developed.
Development of Audio Tape Recording:

The technology of magnetic recording or "audio tape recording" was invented by Valdemar Poulsen, a Danish engineer, in 1889. (18,7) His magnetic recorder was known as the "telegraphone", and it recorded sound magnetically on wire. Initially, Poulsen used steel piano wire as the recording medium for his telegraphone, which produced poor quality recordings as the wire would twist and throw the crosswise recording out of alignment. In order to eliminate this problem, Poulsen replaced the piano wire with steel tape, which made the recording system bulky and cumbersome. Until a more suitable recording medium could be found, audio tape recording was not commercially viable.

A major breakthrough in the development of audio tape recording occurred in 1935 with the introduction of paper tape coated with a magnetic substance as the recording medium. (18,15) Paper tape was less expensive and easier to handle than steel tape and therefore became an instantaneous success. By the end of the Second World War, the technology had progressed to the point that it was possible to record a full 10 Kilo Hertz (kHz) signal with very low distortion on coated paper tape. By the end of the 50's, developments in electronics had reduced the cost of the recorders, and the introduction of coated Mylar tape as the recording medium had made the tapes easier to handle.
One of the most significant developments in the use of audio tape for education was the introduction of the audio cassette by Philips. (18,74) The overwhelming educational advantage of audio cassettes and recorders as opposed to other types of audio tape equipment is its simplicity of use. As the tape is enclosed in a plastic shell there is no need for threading the tape into the recorder for recording and playback. The actual process of recording and playback is also simplified, as many recorders designed for educational use have controls that are not complicated. Finally, the cassette standard has now become so universal that it is possible to find these recorders in most places and there are no compatibility problems.

**Slide-Tape Synchronization:**

The objective of a slide-tape program is to project slides in synchronization (sync) with audio material recorded on tape. (39,94-97) To do this the operation of the slide projector must be controlled by the audio tape. This is done by using a projector with remote control that will advance slides when it receives sync pulses from the audio tape. With stereo tape recorders or recorders that are able to playback two tracks simultaneously, the audio is recorded on one track and the sync pulse on the other. The international standard for open reel sync pulse signal is 1 kHz for 0.45 seconds. When using a cassette recorder is used a 150 Hz signal is the standard.
At the present time the technical aspects of producing a synchronized slide-tape program is simple and inexpensive. (33) It is now possible for any individual in the field of education to produce a slide-tape program with little or no outside assistance and at a very low budget.

LEARNING THEORIES

In the early 1900's, as photography and other types of technologies were developed and used in education to a limited extent, concurrently a second revolution taking place; educators and researchers were formulating the theoretical basis for human learning. Concepts and theories formulated by these researchers have had a far reaching impact on the design and use of instructional media for education.

One of the leading contributors to the field of learning theory was the educational psychologist, Edward Thorndike. (27) Theorists of that time emphasized practice and repetition in the learning situation. Departing from the current thinking, Thorndike gave equal importance to reward or punishment, success or failure, and satisfaction or annoyance to the learner. Eliminating the view that the human being is sinful or good, he maintained that human beings are masses of "original tendencies" that can be exploited by the type of learning. He formulated his laws of learning that were basic to the principles leading to a technology of learning. (6:294)
Thorndike's three laws were:

1. The law of exercise or repetition. Which states that the more times a stimulus inducing response is repeated, the longer it be will retained.

2. The law of effect. This law states that a response would be strengthened if it is followed by pleasure as opposed to displeasure.

3. The law of readiness. Thorndike hypothesized that due to the structure of the nervous system, certain conduction systems would be predisposed to conduct rather than others in given situation.

Thorndike based these laws on a stimulus-response hypothesis that a neural bond would be formed between the stimulus and response and that repetition of the stimulus and response would form patterns of behavior.

Using these laws as a framework, he formulated the basic principles underlying his technology of instruction as: (1) self-activity; (2) interest (motivation); (3) preparation and mental set; (4) individualization; and, (5) socialization. To apply these principles the instructor had to control the activities of the learner without ignoring the his or her interests and individual responses to the stimuli. As learning depended on each learner's past experience and mental set, the instructor had to take into consideration individual differences in designing instructional activities and media so that optimum conditions were created. Finally, he postulated that every quantum of learning had its social implications and, therefore, all learning had to be in a natural social setting.
The other major contributor to educational psychology during the early 1900's was John Dewey. (6:484) His theories were opposites of Thorndike's in many respects. Dewey reasoned that the reflect arc concept was not a workable hypothesis; as in his view any learning had to have a two way interaction between the learner and the environment. His theory was based on the premise that for learning to take place, the learner had to receive cues and problems from the environment. These cues and problems are interpreted and evaluated by the human nervous system and satisfactory solutions formulated.

To Dewey all thinking that was worthwhile had to be reflective. He defined reflection as an active, persistent, and careful consideration of a belief or supposed form of knowledge leading to the grounds that would support or deny it and thus lead to further conclusions. He indicated several steps in the reflective thinking process. Initially, the learner had to recognize a problem, and preferably, become aware of a goal, but feel blocked by some intervening impediment and feel a lack of continuity. In the next stage the learner would formulate some hypothesis in order to find a solution and some generalizations. In the third step the learner would test his hypothesis against existing knowledge or expertise which would restore the continuity or the goal would be further clarified. The learner would then test the hypothesis again to estimate the implications and deductions. In the
final step the learner would be able to draw conclusions. This might involve the acceptance, modification, or rejection of the hypothesis; or, the learner might reach the conclusion that with the given evidence it is not possible to take a line of action or unqualified position. In Dewey's view these steps in the process of reflection were not rigid, but were flexible and a learner could move back and forth between steps. By approaching learning as a process where the learner, when presented with a problem, would formulate a hypothesis, test it, and draw conclusions, Dewey was the first person to apply scientific method to instruction.

Based on Dewey's theories, Kilpatrick developed his Project Method. (32) This was an effort to bring together Thorndike's connectionism with Dewey's theory of instruction. Kilpatrick's method can be described as purposeful activity conducted by the learner with specific goals in mind in a social environment. He designed his curriculum as a series of meaningful projects for the learner. In such a design Dewey's problem solving method becomes just one type of project among many different types; not all of the projects followed the scientific method.

Individualized instruction was the next innovation to take place in the field of instructional technology. In the early 1900's the most prevalent mode of education was systematized, organized group instruction which did not take into consideration individual differences or needs.
Breaking from this traditional mold, Fredric Burk (12:2275) developed one of the first self-instructional manuals that required minimal input from the instructor and allowed the learner to progress at his own pace. Similar programs were also designed by Parkhurst (12:2466) and Morrison (4). These programs included some group activity along with self-instruction. The major contribution of the individualized instruction method was its opposition of the notion that only a few learners are able to achieve mastery of a given subject. This method also stressed the importance of planning and organizing instructional material. In doing this it was possible for the designer to understand the learning process better.

The gestalt psychologist, Kurt Lewin, was one of the major contributors to learning theory. (5) Even though his primary work was in the area of group dynamics, he was also interested in developing scientific principles of learning. Lewin's cognitive-field theory of learning was based on his general field theory which can be stated in a formula as:

\[ B = f(P,E) \]

where B-the behavior is dependent on the P-the person and the E-environment in a psychological f-field or life space. He applied this concept to learning and defined learning as a process where the learner comes to know himself and his environment and based on this insight acts in or on the environment. With this perspective in
mind, he viewed education as a process where the instructor's role was that of a communicator, who by communicating directly or through media, alters the cognitive field of a specific learner; the learner views these cognitive structures in terms of expectations, needs, and demands. The instructional message is a planned, organized stimulus field designed to structure the cognitive field of the learner through the use of single or multiple channels of communication.

In 1952 B. F. Skinner published his book "Science and Human Behavior" where he presented his theory of operant conditioning, which was a modern extension of Thorndike's stimulus response psychology. (42) Skinner's basic concept was that when an organism produces a desired response, it must be appropriately reinforced; this would greatly increase the probability of the organism exhibiting a similar response in the future. To design instruction, based on this concept, the instructor first had to determine the desired behavior in the learner then design reinforcement that would elicit such behavior. In order to do this, instruction had to be broken into small steps with reinforcement issued upon successful completion of each step. By making these steps as small as possible, the probability of error was reduced, thus negative reinforcement was reduced or eliminated. Programed instruction is an example of an instructional device that utilizes Skinner's principles.
RESEARCH FINDINGS ON THE USE OF VISUAL AND AUDIO MEDIA FOR EDUCATION

Major developments in the use of visual medium for education and training did not take place until the Second World War. The unprecedented need for trained workers in industry and the need to train the military quickly and effectively promoted the use of all types of educational strategies. One of the major outcomes of this situation was that the U.S. Office of Education produced large numbers of educational films and in so doing was able to develop some general guide lines for the designing and production of effective educational films.

One such set of findings, with implications to slide-tape programs, was the evaluations and conclusions reached regarding the use of training films by the Division of Visual Aids for War Training. (38,163-166) The general conclusion reached by the Division was as follows:

1. Training films worked effectively in training more people, in more subjects faster than most other means of education.

2. The visual form of communication was so new to education and training that it was difficult to comprehend the logic and production techniques that would be most effective.

3. Visual materials were powerful tools, but they should not be considered as a panacea to solve all instructional problems. There is danger in over optimism and over expansion of use of visual aids.

4. Along with the need for more complete knowledge of designing instructional films the need for information regarding the manner in which students learn from film should be researched.
Some specific conclusions of the division were:

1. The use of film speeded up instruction without any loss of effectiveness of learning. Therefore, instruction could be accelerated.

2. When films were used students felt that the instruction was more interesting and consequently there was less absenteeism.

3. Films made for university or college use could be used effectively at a lower level.

These statements were not based on scientific studies on the nature and use of visual materials, but were observations of designers and users of these materials.

One of the earliest studies on the effectiveness of visual material for education was conducted by Heidgerken in 1948. (25) For this study 405 students were randomly assigned to three groups. The first group was instructed by motion picture, the second by slides only, and the third received both slides and motion pictures. The study found that there was no significant difference in learning between the three groups.

The effectiveness of audio tape and audio tape with visual material was studied by Engel and Wakeford in an experiment that included students from various levels and subjects. (21) They found that there was no difference in the rate learning between tapes and lectures. Further, they found that audio tape, when supplemented by visual material, produced effective education. They also found that there was no marked difference in learning between senior and junior students.
Popham conducted a study comparing live lectures to recorded lectures. (35) In this study graduate students in education were matched in aptitude and subject matter pretest. One group was taught by lecture and the other by a recording of the same lecture. The researcher found no significant difference in learning between the two groups.

A number of studies conducted in England indicated some special characteristics of slide-tape programs. Harden et. al. by presenting to their subjects slide-tape programs of different lengths, found that the maximum length for concentrated learning should not exceed forty-five minutes, and that the optimum was between twenty-five to thirty minutes. (24) In comparing individual viewing of slide-tape programs to group presentations, Dunn et. al. found both modes equally effective. (19) In a pilot test Clark found that in comparing two groups of students, one receiving self instruction with audio tape and the other conventional class instruction, there was no significant difference in learning in an immediate posttest, but there was a decrease in retention in the class instructed group over the long term. (11) Phillips compared the lecture method to slide-tape in an ophthalmology course and found no significant difference in the test results. (24)

In order to determine learners' attitudes towards slide-tape programs, Marchant conducted an experiment that included 616 students at an university. (31) Students
were shown a slide-tape program on how to use the library. After the program they were given a questionnaire regarding the effectiveness of the program, ease of learning, appropriateness of visuals and audio. The students were asked to respond on a scale of 1 to 5, with 5 indicating a strong agreement with the statement, and 1 indicating a strong disagreement with the statement. The responses to all the questions fell between 3.72 and 4.76, with the overall preference for the slide-tape program scoring 4.05 which indicated that there was a general preference for the slide-tape program.

Wells conducted a comparative study of motion pictures, slides, and still pictures shown in a sequence. He had a sample of 594 college students who were assigned in a factorial design to three different treatments of the same lesson in Botany. He found different results depending on the type of concepts that had to be communicated. For communicating concepts involving time, motion pictures were the best medium. There was no significant difference when the concept was motion, while concepts involving space were best communicated with slides and photographs in a sequence.

CHARACTERISTICS OF SLIDE-TAPE PROGRAMS

By the studies that have been reviewed it is evident that slides, audio tape, and slide-tape programs have specific characteristics and are effective in transmitting specific types of information. Allen devised a chart that
Table - 2

Instructional Media Stimulus Relationship to Learning Objectives (Allen-1)

<table>
<thead>
<tr>
<th>Learning objectives</th>
<th>Audio Recording</th>
<th>Still Pictures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning factual information.</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Learning visual identification.</td>
<td>low</td>
<td>HIGH</td>
</tr>
<tr>
<td>Learning principles concepts and rules.</td>
<td>low</td>
<td>Medium</td>
</tr>
<tr>
<td>Learning procedures.</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Performing motor skills.</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>Developing desirable attitudes, opinions and motivations</td>
<td>Medium</td>
<td>low</td>
</tr>
</tbody>
</table>

specified the effectiveness of different media in achieving different learning objectives.\(^1\) Pertinent portions of the chart are reproduced here. In his chart Allen lists both audio recordings and still pictures, but not a combination of both these media. Other researchers have found that multimedia of slide-tape have characteristics that are quite different from each of the media independent of the other.

Lonigro and Eachenbrenner designed a media selection model that indicated the effectiveness of slide-tape programs in meeting specific learning objectives.\(^29\) Appropriate portions of the model are reproduced here. This model, when compared to Allen’s chart, shows clearly that when these media are used together they have different characteristics than when they are used alone. They also
### Table - 3

**Effectiveness of Slide-Tape Programs**  
*(Lonigro and Eschenbrenner - 28)*

<table>
<thead>
<tr>
<th>Learning objectives</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning factual information</td>
<td>Partially effective</td>
</tr>
<tr>
<td>Learning multiple discrimination</td>
<td>Highly effective</td>
</tr>
<tr>
<td>Learning principles</td>
<td>Partially effective</td>
</tr>
<tr>
<td>concepts and rules</td>
<td></td>
</tr>
<tr>
<td>Learning procedures</td>
<td>Highly effective</td>
</tr>
<tr>
<td>Performing skilled perceptual</td>
<td>Low effect</td>
</tr>
<tr>
<td>motor acts</td>
<td></td>
</tr>
</tbody>
</table>

### Graph - 1

**Comparison of Production Cost to Learning Multiple Discrimination** *(28)*

Terms used in the graph-1:

- **Hi** High cost
- **Md** Medium cost
- **Lo** Low cost
- **LE** Low Effectiveness
- **PE** Partial Effectiveness
- **HE** High Effectiveness
- **PI** Programed Instruction
- **MP** Medium/High cost
- **TV** Low/Medium cost
- **ST** Television
- **SP/G** Slide-tape
- **PI** Motion pictures
- **SP/G** Still pictures/
- **Graph**
devised a graph (See Graph - 1) that compared the effectiveness of various media in meeting learning multiple discrimination to the cost of production of the media. In the graph the authors indicate that slide-tape programs are cost effective in reaching objectives that relate to multiple discrimination. Still pictures or graphs are the only media that reach these objectives more effectively.

According to Anderson, slide-tape programs can be used for communicating effective attitude change material.

(2) In his book "Selecting and Developing Media for instruction", he states the following advantages and disadvantages of using slides, audio tapes and slide-tape programs as instructional tools:

Advantages of Slides: Instructors can adapt slides to different student groups by adding or deleting slides. The large visual display possible with slides allows the instructor to point out critical items. Visuals could be designed for progressive disclosure of information. Special effects, such as cut aways or enlarged views, could be depicted with slides. Slides could be used to economically and in a realistic form show the learner real world scenes. Color visuals can be economically produced, and duplicated in large quantities. The compactness of slides allow for ease of distribution, storage, and transportation.

Disadvantages of Slides: For effective presentations the room lights should be dimmed or turned-off, which could
interfere with note taking. The use of several formats of slides could cause legibility problems when viewed in different instructional locations. There could be some delay in laboratory services in developing some types of slide film.

Advantages of Audio Tapes: Content could be locked in and fixed for exact reproduction. Through the use of different types of recording techniques, self-instructional material that is self-paced and providing reinforcement could be reproduced. Sophisticated self-instructional program devices are available that could synchronize visuals with the audio. Devices are also available that can automatically stop the tape for learner interaction. The mood of the learner can be effected by music and sound effects.

Disadvantages of Audio Tapes: When audio is used alone for long periods of time, without visual stimuli, the learner could get bored. Revision of audio tape is time consuming and could be expensive. Caution should be exercised in pacing and verbal content. If the material is presented too rapidly or the instruction is too complex, the learner may get confused.

Advantages of Slide-tape: Visual and auditory senses of the learner could be occupied capturing the attention of the learner. Each channel could be used to compliment information presented on the other channel. Each channel could be used to clarify the information presented on the
other channel. It is possible to elicit an emotional response from the audience. Limited motion of visuals is possible, at a much lower cost than motion pictures.

Disadvantages of Slide-tape: Development of quality scripts taking advantage of both channels is difficult and requires skill. Learners could get confused if the synchronization between the audio and visuals is lost during presentations. Distribution problems could occur due to incompatibility between the synchronization pulse used on the tape and the type required by the hardware.

**Tuberculosis Disease**

The TB disease in human beings is caused by a type of tubercle bacillus known as "Mycobacterium tuberculosis". (22) When the bacilli infect tissue an allergic reaction sets in and the infection is surrounded by white blood cells; the bacilli are surrounded by other cells and forms a tuber or tubercle which gives the disease its name. Most often the disease involves the lungs and sometimes could infect other parts of the body such as the digestive, lymphatic, urinary, or reproductive systems.

When a person with the TB disease coughs or sneezes, the tubercle bacilli are sprayed into the atmosphere in small droplets. (22) Infection occurs when these tubercle bacilli are inhaled by a healthy individual. The onset of the most common form of the disease, pulmonary TB, is usually insidious; in the initial stages the lesion that occurs is not easily detectable. The symptoms at this
stage may include coughing, fatigue, lingering colds, night sweats, and in young adults, pleurisy. When infected, the disease generally does not occur in individuals during the years of infancy or puberty, but could develop a few years later. If the disease is not treated, there is usually a constant battle between the body's immune system and the tubercle bacilli. Once this happens, the disease will probably progress to the next stage when scarring in the lungs' tissue will occur, which will inhibit proper functioning of the lung. If the disease is allowed to progress without treatment cavities can form in the lungs, which is not only dangerous to the patient, but is dangerous to anyone coming in contact with the patient, as large amounts of tubercle bacilli are released from the cavity for several years.

One of the most effective and common forms of testing for TB is the "skin test" - intracutaneous (Mantoux) test. (40) This test is performed by intracutaneous injection of purified protein derivative (PPD) of tuberculin on the volar or dorsal surface of the forearm. (29) The material is injected just beneath the surface of the skin, which is the most common form of the test, but it can also be conducted by jet injection or multiple punctures. The injected area is inspected on the second or third day after the injection. Reading is taken as to the size of the induration of the injected area. The test result is considered to be a "positive reaction" if the induration is more than
10 mm., in which case the test need not be repeated. If
the induration is between 5 mm. and 9 mm. the reaction is
considered to be doubtful. However, if a person with
doubtful reaction is known to be in close contact with a
person who has a positive reaction, then a radiographic
test is recommended. For all other persons the test may
have to be repeated. If the induration is 0 mm. to 4 mm.
then the reaction is considered to be negative. This
reflects either a lack of tuberculin sensitivity or a low
grade sensitivity, no repeat test is required.

Before the introduction of chemotherapy, that is ef-
fective as the kind used today, relapses were common. (3)
In many cases prolonged stays in sanitariums or surgical
procedures were needed. The treatment for TB today is
usually chemotherapy, especially for those with the dis-
eease in a dormant stage. (3) Some of the more common
drugs used are Isoniazid (INH), which is very effective
against tubercle bacilli and is used to eliminate the
bacilli in a dormant state; Rifampin (RIF), also used for
the same purpose and when combined with INH can reduce the
duration of the treatment; Pyrazinamide, used when the ba-
cilli are thought to be resistant to INH; and, Ethambutol,
used mainly to cripple the tubercle bacilli. One of the
problems of using any of the drugs mentioned above is
that preventive therapy for patients with the disease in a
dormant state is of long duration, taking from 9 to 24
months. Some of these drugs are also known to cause mild
to severe side effects with some individuals. However, considering the alternative of the disease possibly becoming active, the time duration and side effects are a small price to pay.

SUMMARY

Visual materials, specifically slides, have been used in education for quite a long time. Due to advances in technology, it has now become easy to produce slides and slide-tape programs. Learning theories based on the psychology of learning propound useful recommendations and suggestions for the effective use of still visual material and audio for instruction and education. Experts in the field of instructional technology have indicated that slide-tape programs have special qualities that should be considered before selecting it as an educational tool. Researchers in medical education and other educational fields have used slide-tape programs successfully in various settings. However, there is only limited data as to the effectiveness of slide-tape programs for increasing knowledge in a health education setting. This study intends to add to this data base.

TB is a difficult disease to treat. It can stay dormant in an individual for so long, without any physical disabilities, that the person may not perceive any threat. When the disease does become active the initial symptoms are so akin to every day maladies that, again, the patient may not perceive the threat.
Chemotherapy for the disease is very effective, though of long duration. Given this set of circumstances, this researcher felt that there was an acute need for an education program on TB that would increase the knowledge of TB victims about the disease and its control.
Chapter III

METHODOLOGY

The objective of this project was to determine the effectiveness of a slide-tape program in communicating knowledge that relates to health. To achieve this goal, the effectiveness of the slide-tape program was compared to a more traditional mode of health education; namely, a lecture.

This chapter will describe in detail the process that was used in the design and production of the slide-tape program. The procedure used in formulating the pre and post tests, and the process by which the results from these tests were collected, will be outlined.

Designing the Instructional Media Program

The instructional slide-tape program was designed and produced at the California State University, Northridge, student health center. The resident chest specialist-physician and the public health nurse responsible for the TB education program were consulted extensively in order to determine the most important areas of content that should be included in the program. Members of the target group were interviewed to discover their need for information about TB. Detailed information regarding the various aspects of the disease was gathered from the medical literature.
On the basis of all of this information a number of behavioral objectives were formulated. These objectives stated that the learner would be able to:

1. Identify the organs of the body that can be damaged by TB.

2. Identify the means by which the TB infection can spread from person to person.

3. Identify the condition under which the TB organism would remain dormant in the lungs.

4. Identify the incubation period for the TB organism.

5. Identify the best means of preventing an infected person from developing the disease.

6. Select TB symptoms from a list of general symptoms

7. Identify the conditions under which an individual would run a great risk of developing the disease.

After the objectives were written and approved by the physician, the public health nurse and a consulting health educator the actual production of the program began. The design and production process used in the production of this slide-tape program is outlined in the "Media Production Model" diagramed in Figure -1. In this researcher's opinion this process can be adapted for the production of other types of media for health education by substituting the appropriate production, steps depending on the media to be produced, but retaining the pre-production and post-production steps.
Figure - 1

MEDIA PRODUCTION MODEL

OBJECTIVES

AUDIENCE ANALYSIS

CONTENT DETERMINATION

SELECTION OF MEDIA

SCRIPT WRITING

YES

TEST

REWRITE?

NO

MODIFY

STORY BOARD

YES

CHANGES?

TEST

NO

PRODUCE GRAPHICS

RECORD NARRATION

PHOTOGRAPH GRAPHICS

SYNCHRONIZE SLIDES AND TAPE

EDIT

YES

TEST

CHANGES?

NO

MEET OBJECTIVES?

NO

YES

IMPLEMENT
The script for the slide-tape program was written to include the essential information required to meet all of the stated objectives. The script layout was in the standard format recommended by Sunier (39,16). As the script for a slide-tape program must deal with two channels of communication, visual and aural, the script must have a layout that presents this information clearly. The standard format script has two columns, one for the visual on the left side of the page and the aural on the right side of the page. Following this format the script for this slide-tape was prepared. (See Appendix A) The script consisted of a brief description of the picture for each slide on the left and narration that would be on the audio tape on the right. The combination of a slide with a segment of narration heard with the slide is called a frame. The script was typed with the frames arranged in a sequential order. This script was reviewed separately by the physician-chest specialist, the public health nurse, and a health educator, to check the accuracy of the content, organization of the material, and the learning strategies used. On the basis of the comments received from these individuals the script was revised. This process of testing and revision was carried on until no further changes were indicated.

The script was then tested on individual members of the target group. The methodology for individual tests (See Figure -2) was based on the individual try-out
Figure - 2

INDIVIDUAL TRY-OUT PROCESS

Start here

Try the draft on one learner at a time

Review the part that does not communicate

Revise frames that do not communicate

Does each frame communicate with the learner?

Does the total program communicate with two learners consecutively?

Yes

Proceed for group validation

No

Revise frames that do not communicate

No

Yes

process devised by Machiraju. (30) Comments, suggestions, and criticisms from each member were carefully analyzed and appropriate changes made in the script. Some of the individuals made valuable suggestions regarding the style of presentation, organization of the content, and the language used. These individual tests were conducted until two consecutive tests indicated that no further revisions to the script were required.

This revised script was used to develop a storyboard, which is a device used in the designing of instructional programs that uses both visual and aural media. (39,15)
The benefits of a storyboard are that it gives the designer an overview of the organization of the program, it allows for easy rearrangement of the sequence, deletions, additions, and change of frames; further, it allows for the testing of visual material in the program. Every frame of the script had a storyboard card that represented that frame. Each storyboard card for each frame had a drawing of the picture that would be appear on a slide for that frame and corresponding narration on a 5 x 8 card. (See Appendix B) The completed storyboard was reviewed by the physician-chest specialist, the public health nurse, and a health educator. Revisions were made in the storyboard according to the comments from these individuals.

The next step was testing the storyboard with individual members of the target group. These tests were extremely useful in determining the effectiveness of both the visual and the aural portions of the program. Individualized testing and revisions were carried on until two consecutive tests indicated that no further changes were needed.

PRODUCTION OF THE SLIDE-TAPE PROGRAM

The final revised version of the storyboard was used to produce the program. A color picture of the drawing in each frame was prepared. Photographic slides of these color pictures were made. (33) A recording of the narration was made on one track of an audio tape cassette. On the other track of the same audio cassette 150 Hz tones
were recorded such that they corresponded to the points in the narration where the next slide should be projected.

The equipment used to display this program consisted of a Kodak Ektographic projector and a 3M audio cassette player that could send sync pulses to the projector to advance the slides and project them. The cassette player was connected to the projector such that when a sync pulse was sent from cassette player to the projector, the projector would automatically project the next slide. In this manner the program, which ran for a duration of 4 minutes and 20 seconds, was projected automatically, with the narration in exact sync with the slides.

Selection of the Population

The criteria for the selection of the population was based on several facts and needs. The student health center at CSUN conducted TB testing for foreign students on a regular basis. The students were given the tuberculin skin test. Those exhibiting a positive reaction to the test were required to attend a TB information session. These sessions were usually conducted individually or in small groups by the public health nurse. As these sessions had to be conducted a large number of times each semester, it was felt that some form of packaged educational program that could be used either individually or for groups would be useful.

The other major criterion was that the incidence of TB in the general population in the local area had not
decreased in the past few years, even though it had decreased nationally. (See Table-1) There was also data from the Center for Disease Control that indicated that foreign nationals who had recently arrived in the country had a higher incidence of TB. (7)

Testing Procedure and Evaluation

Members of the target population were divided into two groups, Group I and Group II. The members of Group I were shown the slide-tape program, while the members of Group II attended a TB information session; which was a lecture given by either the physician or the public health nurse. In order to determine the effectiveness of the slide-tape program, both groups were given a pretest before the education program and a posttest after they had either viewed the slide-tape program or attended the information session.

The content of each question in the pre and pos tests were directly related to one of the objectives. There were a total of seven questions in the test. (See Appendix C) The first five questions were multiple choice type, with four answers provided for each question. Only one answer was correct for each question. In scoring these questions each correct answer received one point score. The other two questions had six answers, among these four of the answers were correct. The students were asked to select all of the correct answers. The score for each
correct answer in this section was 0.25 points with the possibility of four answers being correct, giving a total of one point score.

The pretest, posttest questionnaire was subjected to individual try-out to determine if the instructions, the questions, and answers were clearly understood. Revisions were made until two individuals completed the questionnaire successfully. Many valuable suggestions were made during this process which improved the test instrument.

Initially, the members of Group I were given the pretest, then they were shown the slide-tape program. Immediately after viewing the program they were given the posttest. The difference in pretest and posttest scores were calculated. Members of Group II were given the pretest and then they attended the TB information session. At the end of the session they were given the posttest. The difference in the pretest and posttest scores were calculated. The pretest scores of both the groups were compared to determine if they had the same level of knowledge before the educational programs. Student's t test was used to compare the mean pretest scores.

The final operation was the analysis of the test scores. The mean pretest and posttest scores of both groups were calculated and graphically represented. The mean difference between the pretest and posttest scores were calculated. Student's t test was used to compare the difference between the two groups.
Along with quantitative analysis of the test data, a subjective qualitative analysis was performed by this researcher. Two informal interviews were conducted with the public health nurse; one after her lecture on TB and the other after she had presented the slide-tape program to Group I. Her comments as to the effectiveness of the slide-tape program and her lecture in communicating the information were recorded. Also, her perceptions as to how the students responded to the presentations were noted.

After the slide-tape program and the lecture, members of both groups were interviewed by this researcher. Informal interviews were conducted in small groups of no more than three individuals. The interview consisted of questions regarding the effectiveness of both modes of communication. Interaction between group members was encouraged to record diverse views.
CHAPTER IV

RESULTS

There were two major goals to this project; to develop a slide-tape program on TB and to determine if the slide-tape program was effective in communicating the information. In developing the program, individual try-out's were conducted at two stages of the production; at the script stage and at the storyboard stage. Individuals selected for the try-out's were members of the target population. A number of revisions were made in both the script and the storyboard. The try-out's were conducted until the script and the storyboard were completed successfully by two individuals consecutively. Further testing was conducted on an individual basis after the slide-tape program had been produced. Some changes had to be made in the narration and some slides had to be redesigned so the message was communicated clearly. Individual try-out's were also conducted on the test questions that would be used in the pretest and posttest.

To study the effectiveness of the slide-tape program, members of the target audience were divided into two groups. Both groups were administered the same pretest; then Group I was shown the slide-tape program and Group II attended a lecture on TB given by the public health nurse.
After these educational programs, both groups were administered the same posttest.

**DATA ANALYSIS**

In both groups the number of students who answered questions correctly in the pretest was calculated. (See Table 4) This was done in order to determine the knowledge that members of both groups had before the educational programs. The number of students who were able to answer the questions correctly ranged from 17 to 32 in Group I, and from 14 to 32 in Group II; and, the total number of students that were able to answer specific questions correctly was similar. Question number 3 was the easiest to answer, with over 30 students in both groups giving the correct answer. The most difficult question to answer was question number 1 for both groups. As large numbers of students were able to answer some of the questions correctly in the pretest, this researcher initially deduced that the students were guessing the correct answers or that the test was too easy. On interviewing members of both groups, it was discovered that

<table>
<thead>
<tr>
<th>Question</th>
<th>Group I (n=34)</th>
<th>Group II (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>5</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>6</td>
<td>26.75</td>
<td>29.50</td>
</tr>
<tr>
<td>7</td>
<td>30.25</td>
<td>31.50</td>
</tr>
</tbody>
</table>
the questions were of moderate difficulty and that these students indeed had the knowledge and were not guessing.

Further analysis of the pretest scores was conducted to ascertain the similarity in the knowledge level of both groups before the educational programs. It was found that the mean scores for both groups were similar and the difference between the means was 0.046. (See Table 5) The range of scores was also similar in both groups. The Student's t test was calculated and it was found that there was no significant difference between the pretest scores of both groups, (p<.01). This indicates that initial knowledge about TB was similar in both groups.

The primary goal of this study was to determine the effectiveness of the slide-tape program. This was done by calculating the number of students that were able to achieve the seven behavioral objectives, stated in the chapter on Methods, after they had viewed the program. As the questions in the pretest and the posttest were

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean Score</th>
<th>Range</th>
<th>Standard Deviation</th>
<th>t</th>
<th>I-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>34</td>
<td>4.72</td>
<td>3.00 - 6.25</td>
<td>0.85</td>
<td>0.2170*</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>37</td>
<td>4.68</td>
<td>2.50 - 6.00</td>
<td>0.76</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$t_{critical}$ with 69 degrees of freedom and $p<.01 = 2.64$

*Not statistically significant at .01
directly related to the objectives, it was possible to ascertain how many students achieved the objectives in pretest and posttest in both groups. The number of students that were able to achieve the objectives in the

Table - 6

Percentage of Students that Achieved the Behavioral Objectives in both Groups During Pretest and Posttest

<table>
<thead>
<tr>
<th>Objective</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group I</td>
<td>Group II</td>
</tr>
<tr>
<td>1</td>
<td>52.9</td>
<td>37.8</td>
</tr>
<tr>
<td>2</td>
<td>82.3</td>
<td>86.5</td>
</tr>
<tr>
<td>3</td>
<td>94.1</td>
<td>81.0</td>
</tr>
<tr>
<td>4</td>
<td>50.0</td>
<td>51.3</td>
</tr>
<tr>
<td>5</td>
<td>64.7</td>
<td>75.7</td>
</tr>
<tr>
<td>6</td>
<td>78.7</td>
<td>79.7</td>
</tr>
<tr>
<td>7</td>
<td>89.0</td>
<td>85.1</td>
</tr>
</tbody>
</table>

pretest and the posttest in both the groups is presented in percentile form in Table 6. In Group I the largest improvement in achieving an objective was 41.1% and the smallest was 5.9%. In Group II the largest and the smallest improvements in achieving an objective was 45.9% and 8.1% respectively. There was some increase in the number of students that achieved objectives in both groups, for every objective. From this data it can be concluded that both media were able to educate the audience, though with
slightly different levels of efficiency. However both media brought about a measurable increase in the number of students who were able to achieve objectives in the posttest.

To determine the variations in the performance of the two groups, the mean pretest and posttest scores were compared. The mean pretest scores of groups I and II were 4.72 and 4.68; while the mean posttest scores were 5.85 and 5.77, respectively. The similarity in these scores is of some significance as it indicates that both groups had the same level of knowledge before the educational program and that the gain in knowledge was similar.

The difference in the pretest and the posttest scores in both groups were compared to determine the difference in learning between the two groups. This would indicate if there was any difference in learning from the two types of educational programs. The difference between the

<table>
<thead>
<tr>
<th>Group</th>
<th>Test</th>
<th>Mean Score</th>
<th>Range</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Pre</td>
<td>4.72</td>
<td>3.00 - 6.25</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>5.85</td>
<td>4.00 - 7.00</td>
<td>0.40</td>
</tr>
<tr>
<td>II</td>
<td>Pre</td>
<td>4.68</td>
<td>2.50 - 6.00</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>5.77</td>
<td>4.25 - 7.00</td>
<td>0.71</td>
</tr>
</tbody>
</table>
two test scores varied from 0.5 to 2 in Group I, and from 0 to 1.75 in Group II. (See Table 8) The standard deviation for the difference in the two tests for both groups was under 0.5. Student’s t test was calculated for the difference and was found to be statistically not significant at < .01 level. Based upon these calculations it

Table - 8

Comparison of Difference Between the Pretest and Posttest Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Mean Difference</th>
<th>Range</th>
<th>Standard Deviation</th>
<th>t I-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>34</td>
<td>1.12</td>
<td>0.5 - 2</td>
<td>0.35</td>
<td>0.2587*</td>
</tr>
<tr>
<td>II</td>
<td>37</td>
<td>1.09</td>
<td>0 - 1.75</td>
<td>0.37</td>
<td></td>
</tr>
</tbody>
</table>

*Not statistically significant at .01

can be concluded that the amount of learning in both groups was very close to being identical. Further, it can be deduced that there is no measurable difference in learning, by using the slide-tape program or the lecture, for this audience.

SUBJECTIVE OBSERVATIONS

In this chapter quantitative data and analysis of this data has been presented. This researcher also conducted informal interviews with the public health nurse who gave the lecture and presented the slide-tape program to the students. Interviews were also conducted with some
of the students. Their reactions to the program are presented here.

The public health nurse had many positive comments about the slide-tape program. She felt that when she lectured to the students she had some "good" days when she was able to communicate effectively, and there were other days when she was not able to communicate as effectively. She was able to judge how effective she had been at any given presentation by the students' reactions, both verbal and non-verbal, and the questions that were asked. She observed that by using the slide-tape program each student that attended the TB information session was assured of getting the same level of instruction, and all of the content would be covered in a logical manner each time. She mentioned that the program could be viewed by students on an individual basis, which would eliminate the need for forming groups, which created schedule problems for many students. On the other hand, she also felt that in a small group lecture situation there were opportunities for interaction between students and the instructor which perhaps facilitated learning. It was her view that some students felt depressed when they discovered that they were tested positive for TB. If these students attended the lecture, they found that there were other people who were facing the same problem as they were. This information seemed to help these students.
Interviews were conducted with the students in small groups of three or four after the educational program. A majority of the students that attended the lecture were glad to have attended it felt they had received valuable information that would help them in decision-making process of whether to undergo chemotherapy. Most of them felt that the lecture was also useful in reminding them of the need to see a physician when they had symptoms similar to TB. There were no generalizable comments regarding this mode of communication.

Students attending the slide-tape program seemed to be more enthusiastic about the program than the other group. Many said that they enjoyed the presentation. In this researcher's opinion this particular comment could be attributed to the novelty factor, where the audience was impressed with the media rather than the message. Quite a few of the students said that they were surprised as to how much they learned from a program of such short duration. Some said that they would like to see the use of slide-tape programs in their regular courses as the medium lends itself to logical organization, succinct, and clear presentations. Students from both groups stated that they were familiar with some of the material presented in the program, but that the program reinforced what they knew, and gave them some new and valuable information.
Chapter V

SUMMARY AND CONCLUSIONS

SUMMARY

The goal of this project was to develop a slide-tape program and test it to determine its effectiveness in communicating health education information. The content for the slide-tape program was TB education. The incidence of TB has been quite high in Los Angeles County as compared to California and the United States in the past few years. One of the preventive health measures to deal with this problem would be to have an effective TB education program.

The slide-tape program was designed and developed at the California State University, Northridge, Student Health Center. As many of the foreign students attending CSUN originate from countries that have higher rates of TB than this country, preventive TB skin tests are conducted. Students that have a positive reaction are required to attend a TB information session, which is usually conducted by a physician or the public health nurse in charge of the TB prevention program.

Based on the information presented in these sessions, behavioral objectives were formulated for an education program. A test instrument was constructed to test for
these objectives. This test was subjected to individual try-out with the target audience, until two consecutive individuals completed the test without any comments. Information about TB was gathered from the medical literature; and, in consultation with the physician-chest specialist, the public health nurse, and a health educator the script for the slide-tape program was written. This script was subjected to individual try-out with members of the target audience. The program was revised until two consecutive individuals completed the script without any problems. A storyboard was prepared from this revised script and subjected to individual try-out with members of the target audience who provided many valuable suggestions for improvement. The try-out was continued until two consecutive individuals completed the storyboard without indicating any changes.

Color drawings of the storyboard pictures were prepared and photographed on slides. The narration was recorded on one track of an audio cassette, and on the other track sync pulses that would advance the slides were recorded. Thus, the program could be shown with the slides and the narration in perfect synchronization every time. The program was subjected to a final test before it was used for the project.

Two groups of the target audience were formed. Both groups were given a pretest and than Group I was shown the slide-tape program while Group II attended the lecture.
Immediately following the educational programs both groups were given the posttest. After the test informal interviews were conducted by this researcher.

The tests were scored according to the number of correct answers. Pretest scores of both the groups were compared to determine the entry level knowledge. The statistical method used here was the 't' test, to test the difference between the means of the pretest of the two groups. It was found that there was no significant difference in the entry level knowledge between the two groups.

Mean scores and the percentage of scores were calculated for both groups for the pretest and posttest. Also, the number of individuals that were able to achieve the objectives was determined. The Student's 't' test was used on the mean difference between the pretest and posttest scores for both the groups. It was found that there was no significant difference in the learning between the two groups even though they were exposed to two different media.

During the informal interviews after the presentation, the public health nurse indicated that in her view the slide-tape program was an effective means of transmitting the information and that the quality of the message would be the same every time the program was presented. Some of the students interviewed commented on the efficiency of the program in communicating the information in a short duration. Most of the students felt that the format
of the slide-tape program was such that it could present information in a logical, sequential manner with the visual and the aural media complimenting each other.

CONCLUSIONS

Based on the analysis of the data and the interviews, it can be said that the slide-tape program was as effective as the lecture in communicating the information. To further study this problem a comparison of the effectiveness of other media as compared to slide-tape programs may be in order. However, the result obtained here indicates that slide-tape programs can be useful educational tools, if they are produced to meet specific objectives and used for that purpose exclusively.

To a great extent the success of this slide-tape program can be attributed to the suggestions made during individual try-outs. This indicates the need for careful formative testing that would yield valuable information for modifying the program. Further studies should be conducted to determine the optimum number of tests and the procedure that should be used for these tests.

From the literature on instructional media it is clear that media should be matched to the behavioral objectives. This could be the key to educational strategies that involve media. The study of motivational features of various media could provide some insights into the possibility of using media to promote changes in health behavior.
BIBLIOGRAPHY


33. Planning and Producing Slide Programs, Motion Pictures and Audiovisual Markets Division, Kodak Publications, Rochester, 1975.


41. Wells, R. F., *A Study to Determine Whether General Concepts Which are Usually taught by Motion Pictures can be Learned as Effectively by Sequential Still Photography During Traditional Versus Self Paced Study Periods*, Doctoral dissertation, Purdue University, 1969.

SLIDE-TAPE PROGRAM SCRIPT

Key To Abbrevations Used In the Script:

<table>
<thead>
<tr>
<th>CA</th>
<th>CAPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CU</td>
<td>CLOSE UP</td>
</tr>
<tr>
<td>ECU</td>
<td>EXTREME CLOSE UP</td>
</tr>
<tr>
<td>GR</td>
<td>GRAPHIC</td>
</tr>
<tr>
<td>LS</td>
<td>LONG SHOT</td>
</tr>
<tr>
<td>MCU</td>
<td>MEDIUM CLOSE UP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FRAME NUMBER</th>
<th>PICTURE</th>
<th>AUDIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Title</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GR of lungs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CA Tuberculosis</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Title</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Media Production</td>
<td></td>
</tr>
<tr>
<td></td>
<td>by</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R.S. Ram</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>GR Line drawing of lungs with CA &quot;Tuberculosis&quot;</td>
<td>TUBERCULOSIS IS PRIMARILY A LUNG DISEASE. IT CAN ALSO AFFECT OTHER PARTS OF THE BODY AND BRAIN.</td>
</tr>
<tr>
<td>4.</td>
<td>CU Injecting the PPD CA &quot;Skin Test&quot;.</td>
<td>TO DETERMINE IF A PERSON IS INFECTED WITH TB A SMALL QUANTITY OF DEAD TB GERMS ARE INJECTED UNDER THE SKIN . . .</td>
</tr>
<tr>
<td>FRAME NUMBER</td>
<td>PICTURE</td>
<td>AUDIO</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>5.</td>
<td>CU Injected area</td>
<td>THE INJECTED AREA IS OBSERVED 2 OR 3 DAYS LATER. IF THERE IS NOTICEABLE SWELLING THEN THE TEST IS POSITIVE.</td>
</tr>
<tr>
<td></td>
<td>CA &quot;Positive Reaction&quot;.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>LS Crowded classroom.</td>
<td>THE TB INFECTION SPREADS FROM A SICK PERSON TO OTHERS DUE TO CLOSE CONTACT WITH THE SICK PERSON.</td>
</tr>
<tr>
<td>7.</td>
<td>Two way split - Mother &amp; sick child MCU. Crowded one room apartment LS.</td>
<td>THE RISK OF INFECTION IS GREATEST WHEN A FAMILY MEMBER HAS TB OR THE INDIVIDUAL IS LIVING IN A CROWDED CONDITION.</td>
</tr>
<tr>
<td>8.</td>
<td>GR Drawings of coughing, sneezing and spiting with CA &quot;Coughing, sneezing, spiting.&quot;</td>
<td>WHEN A PERSON SICK WITH TB COUGHS, SNEEZES OR SPITS THE TB GERMS GET IN THE AIR. ..</td>
</tr>
<tr>
<td>FRAME NUMBER</td>
<td>PICTURE</td>
<td>AUDIO</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>9.</td>
<td>GR Cartoon of TB germ floating in the air.</td>
<td>... AND FLOAT AROUND. WHEN OTHER PEOPLE BREATHE THIS AIR THE GERMS GET INTO THEIR LUNGS. (The same cartoon of the germ will be used throughout this program).</td>
</tr>
<tr>
<td>10.</td>
<td>GR TB germ in the lungs.</td>
<td>ONE IN THE LUNGS WHERE THE ENVIRONMENT IS DARK, MOIST AND WARM THE GERMS GROW AND MULTIPLY.</td>
</tr>
<tr>
<td>11.</td>
<td>GR TB germ lying dormant in the lung.</td>
<td>IF THE BODY DEFENSES OF THE PERSON ARE STRONG, THE GERM MAY REMAIN IN ONE LOCATION AND NOT GROW.</td>
</tr>
<tr>
<td>12.</td>
<td>GR More TB germs in the lung (to indicate increase from the previous frame.</td>
<td>WHEN THE BODY RESISTANCE DECREASES, THE GERMS MULTIPLY...</td>
</tr>
<tr>
<td>13.</td>
<td>GR TB germs making holes in the lungs.</td>
<td>... AND BEGIN TO DESTROY THE LUNG. THE PERSON GETS SICK WITH TB.</td>
</tr>
<tr>
<td>FRAME NUMBER</td>
<td>PICTURE</td>
<td>AUDIO</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>14.</td>
<td>GR TB germ with a tee shirt that says &quot;1970&quot;. CA &quot;I have been here a while&quot;.</td>
<td>THE SICKNESS CAN BE CAUSED BY GERMS THAT MAY HAVE BEEN IN THE LUNGS FOR A FEW WEEKS TO SEVERAL YEARS.</td>
</tr>
<tr>
<td>15.</td>
<td>LS Crowd of people. CA &quot;Who runs the greatest risk of being sick with TB?</td>
<td>THERE ARE SEVERAL GROUPS OF PEOPLE AT GREAT RISK OF BEING SICK WITH TB.</td>
</tr>
<tr>
<td>16.</td>
<td>MCU Mother with sick child.</td>
<td>PEOPLE IN CLOSE CONTACT WITH A PERSON WHO IS SICK WITH TB CAN ALSO GET THE DISEASE.</td>
</tr>
<tr>
<td>17.</td>
<td>Another shot of Frame No. 2</td>
<td>THOSE WHO HAVE A POSITIVE REACTION TO THE TB SKIN TEST . . .</td>
</tr>
<tr>
<td>18.</td>
<td>MCU Doctor checking an x-ray.</td>
<td>. . . BUT DO NOT SHOW ANY SIGNS ON THE CHEST X-RAY ARE AT RISK OF DEVELOPING THE DISEASE.</td>
</tr>
</tbody>
</table>
SOMEONE WHO HAD TB BEFORE IS ALSO VUNERABLE AND MAY DEVELOP THE DISEASE IN ANY PART OF THE BODY.

SYMPTOMS THAT COULD MEAN A PERSON IS SICK WITH TB ARE . . .

FEELING TIRED ALL THE TIME . . .

WEAKNESS . . .

LOSS OF APPETITE . . .

UNEXPLAINED WEIGHT LOSS . . .

CHRONIC COUGH . . .

SPITING UP BLOOD . . .
<table>
<thead>
<tr>
<th>FRAME NUMBER</th>
<th>PICTURE</th>
<th>AUDIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.</td>
<td>LS Woman talking to</td>
<td>THESE SYMPTOMS COULD ALSO MEAN SOME OTHER DISEASE IS PRESENT. SEE YOUR DOCTOR AND LET HIM DECIDE.</td>
</tr>
<tr>
<td></td>
<td>a doctor in his office.</td>
<td>TO PREVENT A PERSON WHO HAS BEEN INFECTED FROM GETTING SICK, THE GERMS MUST NOT BE ALLOWED TO GROW. THEY MUST BE STOPPED!!</td>
</tr>
<tr>
<td>28.</td>
<td>GR A gun being fired at the</td>
<td>THIS IS DONE BY TAKING A DAILY DOSE OF INH PILLS.</td>
</tr>
<tr>
<td></td>
<td>germs in the lungs.</td>
<td>THERE MUST BE PERIODIC CHECK-UPS TO ENSURE THAT THERE ARE NO SIDE EFFECTS DUE TO THE INH DRUG. SIDE EFFECTS ARE NOT COMMON.</td>
</tr>
<tr>
<td>29.</td>
<td>GR INH Pill knocking out a</td>
<td>THE TREATMENT TO CURE TB INVOLVES TAKING INH PILLS, AND SEVERAL OTHER DRUGS AND MEDICAL PROCEDURES. THE TREATMENT TAKES A LONG TIME.</td>
</tr>
<tr>
<td></td>
<td>TB germ.</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>MCU Nurse talking to a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>patient.</td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>CU Boy taking pill.</td>
<td></td>
</tr>
</tbody>
</table>
You run a great risk of getting sick with TB if you:
1. Tested positive to the TB test.
2. Are in close contact with a person sick with TB.
3. Checking the x-ray showed lung damage.
4. Had TB before.

In many cases the patient can lead a fairly normal life, barring complications.

Symptoms of TB
1. Feeling tired all the time.
2. Weakness.
3. Loss of appetite.
4. Weight loss.
5. Chronic cough.
6. Spitting up blood.
<table>
<thead>
<tr>
<th>FRAME NUMBER</th>
<th>PICTURE</th>
<th>AUDIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.</td>
<td>CU Pill with glass of water.</td>
<td>IT IS EASY TO GET WELL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TAKE YOUR MEDICINE EVERYDAY.</td>
</tr>
<tr>
<td>36.</td>
<td>LS Couple dancing.</td>
<td>BEING HEALTHY IS MORE FUN.</td>
</tr>
</tbody>
</table>
APPENDIX B
TO PREVENT A PERSON WHO HAS BEEN INFECTED FROM GETTING SICK, THE GERMS MUST NOT BE ALLOWED TO GROW. THEY MUST BE STOPPED!!

THIS IS DONE BY TAKING A DAILY DOSE OF INH PILLS.
PRE AND POST TEST

Instructions: Circle the best answer for each question.

1. TB can damage the following organs of the body:
   A. only the lungs.
   B. the heart and brain.
   C. the kidneys.
   D. all of the above organs.

2. The TB infection can be spread from person to person by:
   A. handling a TB patient's furniture or books.
   B. breathing the air near a person that is sick with TB.
   C. cooking the TB patient's dinner.
   D. none of the above.

3. The TB germs remain in the lungs without multiplying:
   A. when the body defenses are weak.
   B. when you exercise everyday.
   C. when you eat lots of fruit.
   D. when the body defenses are strong.

4. When a person is infected with TB germs he/she can get sick:
   A. within a few weeks.
   B. after a few years.
   C. at once.
   D. both A and B.

5. If a person is infected with TB, the best way to stop the disease is to:
   A. take a long vacation.
   B. exercise.
   C. take INH tablets regularly.
   D. take vitamin tablets regularly.

6. If a person had TB what symptoms would you be able to observe? (check all correct answers).
   A. feeling tired all the time.
   B. weight loss.
   C. chronic cough.
   D. weight gain.
   E. loss of hair.
   F. spitting up blood.
7. An individual runs a greater risk of becoming sick with TB if (check all correct answers):

A. he/she had a positive reaction to TB skin test.
B. he/she is in close contact with a person suffering from TB.
C. he/she is not getting enough rest.
D. his/her chest x-ray shows abnormality in the lungs due to TB.
E. he/she is eating good food.
F. he/she had TB before.