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TEACHING A MODERN FOREIGN LANGUAGE
VIA TELEPHONE

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

By
Philip Dodd Smith, Jr., B.A., M.A.

* * * * * *

The Ohio State University
1967

Approved by

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Adviser
Department of Education
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Above all, I want to express special gratitude to my wife, Shirley, for her encouragement, support, assistance and sacrifice throughout the entire doctoral program.
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>LIST OF TABLES</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>viii</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LIST OF FIGURES</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ix</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTRODUCTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

## Chapter

I. UTILIZATION OF THE TELEPHONE IN FOREIGN LANGUAGE TEACHING .............................. 11

II. DESIGN AND PURPOSES OF THE EXPERIMENT ........................................ 18

   - Underlying Philosophy
   - Hypothesis and Objectives
   - Outline of the Experiment
   - Definitions
   - Significance of the Experiment

III. TELEPHONE TRANSMISSION CHARACTERISTICS AND FOREIGN LANGUAGE PERCEPTION ........................................ 31

   - Noise
   - Amplitude
   - Frequency Response
   - Vowel Transmission
   - Consonant Transmission
   - Redundancy in Speech Perception
   - Foreign Language Transmission

IV. THE SETTING AND PERSONNEL OF THE EXPERIMENT .................................. 46

   - The Classroom Setting
   - The Telephone Equipment
   - The Student Population
   - The Classroom Teacher
   - The Tele-Teacher
   - The Observer
   - Materials
TABLE OF CONTENTS--Continued

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>V. PROGRESS OF THE EXPERIMENT</td>
<td>54</td>
</tr>
<tr>
<td>Preliminary Arrangements</td>
<td></td>
</tr>
<tr>
<td>Instruction Begins</td>
<td></td>
</tr>
<tr>
<td>Student Reactions</td>
<td></td>
</tr>
<tr>
<td>Pronunciation Problems</td>
<td></td>
</tr>
<tr>
<td>Student Evaluation</td>
<td></td>
</tr>
<tr>
<td>Modification of the Program</td>
<td></td>
</tr>
<tr>
<td>Observers</td>
<td></td>
</tr>
<tr>
<td>Close of Instruction</td>
<td></td>
</tr>
<tr>
<td>Student Creativity</td>
<td></td>
</tr>
<tr>
<td>Conclusion of the Experiment</td>
<td></td>
</tr>
<tr>
<td>VI. EVALUATION</td>
<td>69</td>
</tr>
<tr>
<td>Telephone Facilities</td>
<td></td>
</tr>
<tr>
<td>Student Perception of &quot;Problem&quot; Sounds</td>
<td></td>
</tr>
<tr>
<td>Perception of Spanish Sounds</td>
<td></td>
</tr>
<tr>
<td>Pupil-Teacher Interaction</td>
<td></td>
</tr>
<tr>
<td>Rate of Presentation</td>
<td></td>
</tr>
<tr>
<td>Student Achievement</td>
<td></td>
</tr>
<tr>
<td>Student Attitude Changes</td>
<td></td>
</tr>
<tr>
<td>Attitudes Toward Foreign Language Instruction</td>
<td></td>
</tr>
<tr>
<td>Summary of Attitude Changes</td>
<td></td>
</tr>
<tr>
<td>VII. CONCLUSIONS AND RECOMMENDATIONS</td>
<td>96</td>
</tr>
<tr>
<td>Conclusions</td>
<td></td>
</tr>
<tr>
<td>Affirmation of Hypothesis</td>
<td></td>
</tr>
<tr>
<td>Recommendations</td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td></td>
</tr>
<tr>
<td>APPENDIX I</td>
<td>106</td>
</tr>
<tr>
<td>APPENDIX II</td>
<td>111</td>
</tr>
<tr>
<td>APPENDIX III</td>
<td>114</td>
</tr>
<tr>
<td>APPENDIX IV</td>
<td>120</td>
</tr>
<tr>
<td>APPENDIX V</td>
<td>125</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS--Continued

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPENDIX VI</td>
<td>128</td>
</tr>
<tr>
<td>APPENDIX VII</td>
<td>130</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>132</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Special Phonetic Symbols Employed in this Dissertation</td>
<td>27</td>
</tr>
<tr>
<td>2. Frequency of Spanish Consonant Sounds, Modern Spanish, Dialogs 1 and 6</td>
<td>42</td>
</tr>
<tr>
<td>3. Student Population</td>
<td>49</td>
</tr>
<tr>
<td>4. Student Questionnaire</td>
<td>71</td>
</tr>
<tr>
<td>5. Student Perception of &quot;Problem&quot; Sounds without Contextual Clues</td>
<td>73</td>
</tr>
<tr>
<td>6. Common Student Misperception of Spanish Sounds</td>
<td>75</td>
</tr>
<tr>
<td>7. Listening-Comprehension Test Scores</td>
<td>80</td>
</tr>
<tr>
<td>8. Listening-Comprehension Test, Item Analysis</td>
<td>81</td>
</tr>
<tr>
<td>9. Sound Production Scores</td>
<td>83</td>
</tr>
<tr>
<td>10. Free Production Scores</td>
<td>86</td>
</tr>
<tr>
<td>11. Student Response Toward Mexico and the Spanish Language</td>
<td>89</td>
</tr>
<tr>
<td>12. Student Responses on Foreign Language Instruction</td>
<td>93</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Frequency Power Distribution of Speech</td>
<td>34</td>
</tr>
<tr>
<td>2. Combined Characteristics of the Fundamental Sounds of Speech</td>
<td>38</td>
</tr>
</tbody>
</table>
TEACHING A MODERN FOREIGN LANGUAGE
VIA TELEPHONE

INTRODUCTION

The past decade has seen a great interest in and an expansion of the role of modern foreign language instruction in American education.

Arising from new assessments of both individual and national needs and interests as well as new insights into the nature of language and language learning, the direct result has been the establishment of a new philosophy and objectives for this traditional area of the curriculum.\(^1\)

With impetus supplied from both the profession and national needs as expressed in the National Defense Education Act of 1958, the entire field has undergone major changes.

Fundamental has been the philosophy that "All students shall be given the opportunity and be encouraged to participate in the foreign language program."\(^2\)

The traditional two year sequence of foreign language study is now considered inadequate.\(^3\) Recent years have seen great changes and new emphasis in teacher preparation, in new materials, in new methodology, and in the establishment of programs of foreign languages in the elementary schools
Wide use is now made of electro-mechanical teaching aids and in most areas a language laboratory is considered an essential portion of the school plant.

A major effort has been made to provide longer sequences of study, in a variety of modern foreign languages, to a wide student audience.

To reach these three goals, wide use has been made of unprepared teachers supplementing audio-visual language presentations, "traveling" foreign language specialists who teach in several schools throughout the day, educational radio and television and, to a more limited extent, self-instructional programmed materials and correspondence courses.

However, many secondary school modern language teachers are still inadequately prepared and a recent survey of literature on the preparation of elementary school foreign language teachers reveals a lack of development of concrete programs of teacher training.

The Western States Small Schools Project has identified as "small" between 53 and 57 percent of the nation's secondary schools and estimates the population of these schools at more than one million students. Further:

The problems of small schools have accumulated, unsolved, since the 1930's. Although the United States is no longer an agrarian society, there are substantial blocks of rural-dwellers whose educational growth must be extended if they are to continue their contribution to the national well-being.
communications, advances in travel, the rapid generation of knowledge, the trend toward specialization, and higher expectations of parents focus concern for the rural student who will be called upon to compete as an adult with his urban counterpart. 7

In addition it is noted that, "Funds, and therefore services and facilities, tend to be limited. . . . Teachers of high quality are difficult to retain. . . . Curriculums . . . lack depth and comprehensiveness. Among the content deficiencies are . . . e. humanities."8

It must not be assumed that inadequate modern foreign language programs are limited to rural areas removed from urban population centers and educational facilities. The opposite may be true.

A survey of foreign language course offerings and enrollments in the Franklin County, Ohio Schools shows that even in close proximity to a large city, with both educational radio and television available, and near several colleges and universities, programs are very limited in both scope and sequence. Of the eleven secondary schools in the Franklin County system, all are from two to four times larger than "small" (300) as identified by the Western States Small Schools Project.

Of these eleven "large" schools within a short distance of a large metropolitan area, only two have a program in grades seven or eight, only one offers instruction in German, and only four (one-third) offer instruction beyond
Level II. No programs of foreign languages in the elementary school were reported although some may in fact exist.\(^9\)

Several audio-visual programs for foreign language instruction are now available commercially but recent research is divided over the effectiveness of such programs when taught by an unqualified teacher.\(^10\)

Since the actual presence of a skilled teacher in the class is still the best insurance of good instruction, the foreign language specialist who can be shared by several classrooms or several schools is the most desirable teacher aside from the regular classroom teacher who is skilled in foreign language teaching.

It may be impossible to secure such a specialist due to the budget or location of the school. If several schools share the services of a foreign language specialist, valuable time is lost in commuting between schools.

Often it is difficult for schools, even large urban schools, to provide a continuing sequence of study for a few apt and interested students or to provide instruction for a few interested students in a modern foreign language not normally included in the curriculum. As more and more students are provided adequate foreign language programs it is hoped that able students will elect a second or even a third modern language.\(^11\) These may include some of the "Major Neglected Languages," Chinese, Hindi, Arabic, Portuguese, or Japanese.
The use of educational radio broadcasting in the United States has an old history, including its use to teach modern foreign languages. Radio has not been utilized to its fullest educational potential in the United States. This may be because the frequencies best suited for reliable coverage are largely allocated to commercial radio stations. Educational use of the Frequency Modulation portion of the spectrum suffers from the necessity of special equipment, low power, and a "line of sight" range. Other areas of the world are utilizing radio to a high degree in mass education.

Very wide use is made of educational television in the United States. By November, 1965, "... two out of every three students in the nation's schools and colleges will be in areas covered by educational television." The growth and contribution of this medium are indeed great.

Recent research, however, shows that educational television is better for the subjects which lend themselves to demonstrations rather than skills. Even more serious is the demonstration by Moskowitz that children taught foreign languages by television develop a negative attitude toward second language learning. With literally millions of students making their initial contact with a modern language through the television medium, a serious impact--perhaps unfavorable--may strongly affect this area of the curriculum.

Educational television also suffers from several physical limitations. The enormous bandwidth required for video
transmission requires large transmission powers, "line of sight" transmission, and imposes a very limited number of available channels. With the advent of satellite television relays these limitations will become more stringent since channels now simultaneously used at several different parts of the nation will require control to prevent their rebroadcast via satellite.

Many portions of the continental United States are beyond the range of educational television and will remain so for some time, despite the increasing number of television cable distribution systems. High installation costs impede the progress of cable television in areas of sparse population.

Two additional limitations of educational television are important for curriculum expansion in the field of modern foreign languages. First, the high cost of television precludes special programs for small audiences and requires a fixed time allotment. Second, television is essentially a "one-way" device with no provision for student-teacher interaction.

As S. Pit Corder points out, "Television teaching suffers from one very serious defect: it is a vehicle of one-way communication--teacher to learner . . . one element in language teaching, the productive practice element in which teacher and pupils enter into dialogue with each other, is absent on TV."17
Joseph C. Hutchinson, formerly of the United States Office of Education and a recognized authority on the use of electro-mechanical aids in foreign language teaching, comments that, "It is difficult to see how television in its present form can be changed from a lockstep medium to one providing truly individual instruction, since its very mature precludes such transformation."\(^\text{18}\)

H. H. Stern, writing on "FLES: Achievements and Problems," quote Earl Randall, long associated with the Boston Parlons Francais television series, as stating that "... evidence mounts up that only with the aid of teachers can television be an effective means of teaching FLES."\(^\text{19}\)

Television is perhaps the most important technological advance yet offered to education and will greatly influence educational policy. Yet individualization of instruction, instant feedback and flexibility are lost.

Inasmuch as we are living in a world in which all nations and peoples are daily being brought closer together, it becomes necessary for our public schools to promote better universal understanding by offering to all students the opportunity to study foreign languages.\(^\text{20}\)

This statement, typical of many in recent years, emphasizes the responsibility of the school to provide an opportunity to pursue an adequate foreign language program to all students. This opportunity does not yet exist for many Americans, since the problem of providing foreign language programs to schools is, in reality, very great and, as yet,
inadequately answered. It is incumbent upon foreign language educators to explore ways of providing this instruction.

As Robert F. Roeming, editor of the Modern Language Journal, has pointed out:

It seems imperative in this era, when magnitudes are the measure of all things, that more serious thought be given by broader segments of the foreign language teaching profession to the manner in which larger numbers of students at all levels of the educational structure will be taught, and far more important, to the media by which demonstratable proficiency will be achieved.21

With this exhortation in mind, it is the aim of this study to assess the feasibility of expanding the curriculum through teaching a modern foreign language via a medium which is of relatively low cost, is widely available, can be either by wire or wireless, and provides instant student-teacher interaction--the telephone.
FOOTNOTES TO THE INTRODUCTION


5. Philip D. Smith, Jr., "Readings in the Preparation of Teachers of Foreign Languages in the Elementary Schools" (Unpublished MS., The Ohio State University, 1966).


7. Ibid.

8. Ibid., p. 2.


17. S. Pit Corder, "Language Teaching by Television," Trends in Language Teaching, edited by Albert Valdman, p. 239.


CHAPTER I

UTILIZATION OF THE TELEPHONE
IN FOREIGN LANGUAGE TEACHING

Although a relatively "old" technical advance now accepted as a part of everyday life, the telephone has not been widely used as a teaching medium except in instances of providing individualized instruction to homebound students.

The increasing concern with curriculum expansion and improvement paralleled with a vast increase in telephone services has motivated educators to supplement regular classroom instruction by bringing specialists into the classroom by means of amplified telephone.

While pioneered by schools involved in the Catskill Area Project in Curriculum Design in New York and now in intermittent use throughout most of the United States, the past several years have seen the telephone studied seriously as an instructional medium by the Western States Small Schools Project. This five state investigation, supported by the Fund for the Advancement of Education, involves state departments of education and local schools in Colorado, New Mexico, Utah, Nevada and Arizona.
By 1963 Nevada schools made use of the telephone as an enrichment device and an in-service workshop and demonstration. Stevens College, the Colorado State University, the Universities of Utah and Nevada, and the Ohio State University use the telephone to provide teacher-student interaction after formal presentations by tape or radio.

David Jesser, Nevada Director for the Western States Small Schools Project, reported that during the 1965-66 school year many applications were made of the amplified telephone with coordinated visuals including a course in art taught by linking several schools simultaneously to a teacher as far as three hundred miles away.¹

TEACHING FOREIGN LANGUAGES BY TELEPHONE

In the field of modern foreign languages, the telephone has been used to a limited degree in several applications.

During the 1962-63 school year Mr. Robert Dais, Assistant Superintendent of Schools in Siskiyou County, California, provided some instruction in Italian from Yreka to the elementary school at Grenada, California, over a forty mile telephone circuit.² The experiment, noted briefly in California Education was reported successful although recent efforts to obtain information on specific details or reports on the proposed continuation of this experiment have been unsuccessful.
In November, 1963, the author, then Foreign Language Consultant for the Nevada State Department of Education, demonstrated the teaching of an audio-lingual German dialog over a three hundred and twenty mile telephone circuit in northern Nevada.

The same year, 1963, saw the telephone used to teach a foreign language in several schools associated with the Catskill Area Project who had, in 1962, begun the use of amplified telephone equipment to enrich social studies programs.

When the French teacher at Margaretsville, New York, became ill her class finished the year via the telephone with the assistance of the French teacher in another school.

Two elementary school Spanish teachers, commuting between four schools to present lessons to fifth graders on alternating days, used telephone equipment to provide Spanish on a daily basis to all four schools. The teacher taught one part of the class "live" and the other schools participated by telephone. On other days the classes changed roles.

The most concrete work in actual instruction in a foreign language via telephone to date has been that of Dr. Madeleine Coutant and Dr. William Jassey at Laurens, New York from 1962 to 1964.

Dr. Jassey, a Professor of French at the New York State University College at Oneonta, was introduced into regular first and third level high school French classes at Laurens
via telelecture. In their published booklet they describe the enrichment provided secondary school French students. In Level I supplementary conversation units were presented for seven tele-lessons. Dr. Jassey presented weekly literature units to the class for a semester while Dr. Coutant managed the classroom and presented coordinated visuals and correlated classroom instruction.

Both Dr. Coutant and Dr. Jassey as well as other cited observers felt that the experiment was entirely successful.

Instruction was viewed as supplementary to the regular French class and students had access to printed materials concurrently with the telephone presentation of Dr. Jassey.

The telephone has also been used to provide enrichment experiences for advanced students. On April 30, 1965, Mr. J. Michael Moore, Foreign Language Supervisor for the San Diego, California, schools arranged for students to interview Dr. Erich Mende, Vice-President of West Germany. Some two hundred advanced German students participated in the fifteen minute telelecture interview, asking prepared questions. While Dr. Mende spoke coordinated visuals were displayed, including his portrait and a map of Germany.

Another unique application has been the recent three months experiment in telephone homework provided by the Lakewood, Colorado, public schools. In the 1965-66 school year, three hundred and twenty-five French and Spanish students in
all levels and from grades 7 through 12 had available to them home study material by telephone.

By dialing a special telephone number from home students were connected to a three minute continuously playing tape recording, changed daily, which provided drills, dialogues, stories, narrations, skits and songs in the foreign languages. Students were free to use this service at their own discretion.7

While such a program is not totally new, having been provided several years ago in Ceder City, Utah,8 it is the first to be widely publicized and evaluated. In the evaluation, based upon a questionnaire, Mr. Edward J. Tanguay, Foreign Language Supervisor, reported that in Lakewood 72 per cent of the students found the telephone service "helpful," 63 per cent reported they thought new material could be learned via the telephone, and 60 per cent requested that the service be made available throughout the school year. Tanguay's report of the experiment concluded with, "Main concern of school officials was whether telephone fidelity was good enough to carry the taped messages over the receiver. Students said it was."9

During the 1966-67 academic year, the language laboratory of the University of Illinois has been connected to the public telephone system. Students and other interested persons can dial directly from any telephone and hear the same French program available in the laboratory.10
The utilization of the telephone in foreign language instruction to date has been that of an enrichment vehicle. It seems excellently suited to this purpose.

This use does not, however, answer the many pertinent questions concerning the possible uses of the telephone as the sole medium of instruction, either supplementing or replacing other media, where no classroom foreign language teacher is available.

Robert Dais, Assistant Superintendent of Schools in Siskiyou County, California, remarked concerning the Grenada experiment:

We have assumed that television, radio, tape recordings, and so forth are better ways of presenting information through lectures and dramatizations than would be possible through the telephone. By mass communication the material is necessarily one-way and in our democracy there is a fundamental need for each individual to participate. . . . This experiment has made it possible for each child to participate as informally as though the resource person were in the room . . .

Concerning the work of Coutant and Jassey in New York, Dr. Alfred Adler, Professor of Foreign Language Education at Brooklyn College wrote, "I think the tele-lesson is an excellent idea, very fruitful of further development . . .".

The experiment described in the major portions of this report was undertaken as the next logical step in the "further development" of the utilization of the telephone in foreign language teaching, that of providing total instruction to a class via the telephonic medium.
FOOTNOTES TO CHAPTER I

3 "How to Beef Up Your Curriculum with Telephones," School Management, November, 1962, pp. 76-78.
5 Madeleine Coutant and William Jassey, Telephonic Instruction: French Conversation and Literature.
8 J. Dale Miller, Supervisor of Foreign Languages, State of Utah. Personal communication with the author.
9 Tanguay, loc. cit.
10 Fred Jenkins, Coordinator of French Instruction, The University of Illinois. Personal communication with the author.
11 Dais, loc. cit.
CHAPTER II

DESIGN AND PURPOSES OF THE EXPERIMENT

"No one has yet used the telephone medium for systematic evaluation emanating from college specialists for the benefit of high school students," observed Coutant and Jassey prefacing their report on the teaching of French literature by telephone. Their comment is still applicable and generalizable to the wider statement that no one has, to the writer's knowledge, provided and evaluated systematic total foreign language via the telephone to any student population.

James MacDonald, writing in Educational Leadership, has pointed out that in American education more research is needed at the classroom level to permit educators to have confidence in the experience of others.

Egon Guba, noted authority on educational research and change, has pointed out:

... components of an educational invention may, particularly in the design stage, profit from study under laboratory conditions, but the final and most meaningful evaluation must be made in the field with intentions and under conditions that make the experimental mode most meaningful.

It is therefore my considered judgment that both in the case of change research and evaluation, the experimental approach is at present
most meaningful, and I urge it upon you as the preferred strategy, at least at this time.\(^3\)

Since it would seem unadvisable to establish experimental comparison of the telephone with other educational media until more specific information is available on the possibilities and limitations of the telephone, Dr. Guba's "aexperimental" approach has been adopted as most pertinent to this investigation.

The design of the experiment detailed in this chapter, then reflects Dr. Guba's philosophy and definition of aexperimental:

\[\ldots\text{The basic question of the experimentalist is, "What would happen if\ldots," while the basic question of the aexperimentalist is, "What does happen in the real world?" Thus the experimentalist selects on an a priori basis the variables which he wishes to relate, and then arranges a controlled situation so that the effects of other variables are eliminated or at least randomized.\ldots\text{The aexperimentalist may be unsure of the variables that are relevant to the problem of interest to him, or, even given that he can identify the crucial variables, is not interested in studying them in any form except as they do in fact occur naturally.}\ldots\]

Aexperimental research is defined by Dr. Guba as (1) untinged by laboratory bias, (2) set in situ, (3) with free or invited interference, (4) molar in scope, (5) with many and varying treatments, (6) and conducted in a highly contextual situation.\(^5\)

Jerome Bruner has supported this type of curriculum investigation by stating, "It would seem much more sensible to
put evaluation into the picture before and during curriculum construction, as a form of intelligence operation to help the curriculum maker in his choice of material, in his approach, in his manner of setting tasks for the learner."6

HYPOTHESIS AND OBJECTIVES

In order to establish the experimental design and to evaluate the experiment, the following hypothesis was formally advanced: "It is possible for a foreign language teacher to conduct a class effectively via amplified telephone equipment using regular, commercially available, instructional materials."

Since the proposed experiment would be the first formal study of this nature and the first, to the writer's knowledge, to be adequately documented and evaluated, no effort will be made to compare effectiveness of the telephone medium with other media. This will have to be undertaken after the feasibility of telephonic instruction itself is proven. As Guba points out, "Development may or may not be based upon research; it may be desirable to so base it, but perhaps this approach may not be practical because appropriate research is lacking or because available research is ambiguous or incomplete."7
This first study attempts to throw light upon some of the following questions:

1. Can a foreign language class be taught via telephone facilities?
2. Is it practical and economical for schools to expand their curricular offerings in this manner?
3. Can immediate student feedback result in immediate modification of the instructional presentation?
4. Is such modification an asset that cannot be supplied by other media?
5. Is the frequency response of telephone equipment good enough to permit the students to perceive adequately the sounds of a foreign language?
6. Is it possible to use a minimal amount of articulatory information to compensate partially for the inherent poor frequency response of telephone communications?
7. Are students motivated by and responsive to a telephonic presentation?
8. What are some of the problems that arise because of lack of visual contact on the part of the teacher?
9. Should future studies attempt to provide two-way video transmissions when "picture" telephones are available?
10. What are some of the technical problems encountered in the experiment?
11. What are some of the administrative problems encountered in the experiment?
12. How many personnel must be involved in adequately presenting the material?

13. How much preparation must be done in proportion to actual "on-the-air" time and is this comparable to the preparation required by ordinary ETV?

14. Do students receiving foreign language instruction via the telephone develop a generally negative attitude toward foreign languages?

15. Do the students develop a negative attitude toward the telephone as a medium of instruction?

16. Can presentations be recorded in the remote classroom for later practice and review?

17. Will some students not be able to learn via telephone?

18. Will telephonic instruction help to change stereotyped concepts of speakers of the foreign language?

19. What other ideas and implications arise for further study and research?

OUTLINE OF THE EXPERIMENT

In order partially to investigate the question posed above, it was proposed that a practical experiment in the teaching of a modern foreign language via existing commercial telephone systems be established under the auspices of the Ohio State University.
In this connection it was desirable to simulate actual existing school conditions as closely as possible. The experiment, therefore, was proposed in the following form.

A competent Spanish teacher located at a program originating point would teach a class in a modern foreign language located at some distance. Two-way communication would be established via amplified telephone equipment.

The class would be conducted for a thirty minute period daily for eight weeks to simulate the normal school grading period. Materials would be made available to students at the school for individual use.

The "Cooperating Classroom Teacher" would be a regular member of the school faculty placed in the room to (1) assume legal responsibility and fulfill certification laws, (2) take roll and keep order, (3) operate necessary equipment, (4) provide students with gestural cues when necessary and (5) to conduct the recorded drill sessions.

To minimize the effect of this person on the target language acquisition of the students, he or she would be purposely selected on the basis of lack of preparation in a modern foreign language. He or she would have to be an enthusiastic and good teacher who would be willing to be trained in the necessary role in pre-experiment sessions.

To resemble as much as possible an actual school situation, it was proposed that regular commercially available
modern foreign language materials designed for schools be employed, the Encyclopaedia Britannica Films "The Adventures of Miguelito."

Equipment required in the classroom was relatively simple: that at the program origin much more complex but not approaching that required in normal educational television broadcasting. The studio and facilities of WOSU Radio at the Ohio State University were offered to the experiment.

The student classroom would be equipped with (1) necessary amplified telephone equipment, (2) a tape recorder for recording the program from time to time, and (3) necessary books.

DEFINITIONS

Throughout the discussion of the experiment certain terms will be employed that require definition and clarification, both in reference to telephone facilities and foreign language teaching.

Amplified telephone equipment is that which is distinguished from the normal hand-held telephone by being further amplified to the point where sound is produced at a louder level through loudspeakers of various sizes.

Telelecture equipment is a hybrid arrangement of a telephone unit, dial and handset, and a medium powered audio
amplifier with accompanying microphones. It is possible to call either in or out with the equipment and:

... tie in a lecturer or a presenter from a distant point with a school ... in a particular classroom or location. The local amplification equipment permits the entire class to hear the presentation and also to ask questions of or make comments to the presenter ...

"Hands-Off" or "Hands-Free" telephone is a unit designed to permit operation while the speaker is engaged in some other activity. The speaker's voice is picked up and placed on the telephone line by a unit housed in a small plastic box which also controls the on-off function and incoming sound volume. The incoming signal is broadcast by a small loud-speaker housed in a separate plastic unit.

The "Hands-Free" telephone must be used in electrical connection to a regular dial handset to place and receive calls. The latter is switched out of the circuit when the "Hands-Free" unit is activated.

Both the telelecture equipment and the "Hands-Free" units are amplified telephones.

Commercial telephone facilities are the type and quality of circuits available to ordinary home subscribers and not special high fidelity lines.

In the context of the telephone teaching experiment, the classroom teacher designates the regularly assigned and certified teacher normally responsible for the class.
The *tele-teacher* is the specialist teacher who conducts the class from a remote location via the telephone. The *observer* refers to the author in the role of coordinator and trained supervisor as he observed both the class and the tele-teacher during the course of the experiment.

Throughout the balance of this report reference will be made to individual speech phones. Convention will be followed in that these will be indicated by enclosure with slashes, i.e., /a/ /s/. Most of these are self explanatory. A few symbols that will not be readily apparent are illustrated in Table 1.

**SIGNIFICANCE OF THE EXPERIMENT**

The experiment demonstrates the instructional capability of the telephone on a daily sustained basis. The experiment has revealed some of the possibilities, the advantages, the disadvantages, and the limitations of the telephone as a medium of modern foreign language instruction.

If the hypothesis is proven and it is determined that modern foreign languages can be learned from a remote specialist teacher, the following implications present themselves.

First, the establishment of a year-long funded pilot program to enrich the curriculum of several smaller schools
### TABLE 1

**SPECIAL PHONETIC SYMBOLS EMPLOYED IN THIS DISSERTATION**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Conventional Orthography</th>
</tr>
</thead>
<tbody>
<tr>
<td>ϕ</td>
<td>Voiced bilabial fricative</td>
<td>laya (Span.)</td>
</tr>
<tr>
<td>θ</td>
<td>Voiceless interdental fricative</td>
<td>thin (Eng.)</td>
</tr>
<tr>
<td>ġ</td>
<td>Voiced interdental fricative</td>
<td>lado (Span.)</td>
</tr>
<tr>
<td>ё</td>
<td>Voiceless palatal fricative</td>
<td>ship (Eng.)</td>
</tr>
<tr>
<td></td>
<td>Voiced palatal fricative</td>
<td>azure (Eng.)</td>
</tr>
<tr>
<td>χ</td>
<td>Voiceless velar fricative</td>
<td>Juan (Span.)</td>
</tr>
<tr>
<td>ĝ</td>
<td>Voiced velar fricative</td>
<td>lago (Span.)</td>
</tr>
<tr>
<td>є</td>
<td>Voiceless palatal affricative</td>
<td>church (Eng.), mucho (Span.)</td>
</tr>
<tr>
<td>ā</td>
<td>Palatal nasal</td>
<td>señor (Span.)</td>
</tr>
<tr>
<td>η</td>
<td>Velar nasal</td>
<td>cinco (Span.)</td>
</tr>
<tr>
<td>r</td>
<td>Voiceless velar semi-vowel</td>
<td>rare (Eng.)</td>
</tr>
<tr>
<td>ř</td>
<td>Voiced alveolar tap/flap</td>
<td>raro (Span.)</td>
</tr>
<tr>
<td>R</td>
<td>Voiced alveolar multiple tap/flap</td>
<td>arroz (Span.)</td>
</tr>
<tr>
<td>j</td>
<td>Voiceless palatal glide</td>
<td>yes (Eng.)</td>
</tr>
</tbody>
</table>
and to provide advanced instruction or instruction in the Major Neglected Languages\textsuperscript{9} to students in larger schools.

Second, the connecting of schools of central Ohio to the Listening Center of the Ohio State University through state leased lines would become apparent.

Encouragement could be given to the establishment of telephonic centers at various points to provide instruction to schools unable to offer modern foreign languages or for use by college instructors for teaching extension or correspondence courses.

Future teachers of foreign languages in the elementary schools, for example, could be trained in the language at their schools or in their homes. Newly emerging nations might find telephonic teaching considerably more economical, more flexible, and more individualized than educational radio or television in efforts to educate portions of their population in a national language or in a foreign language.

Third, the increasing needs of individual foreign language acquisition by adults could be provided via telephone.

Lastly, with world-wide telephone networks already a reality and with costs becoming less for long distance communications, the modern foreign language student may be able some day to have direct and personal contact with his peer in the foreign country whose language he studies.
SUMMARY

If it can be demonstrated to be an adequate means of teaching students a modern foreign language, the telephone will be able to supplement or replace other media. This initial adequacy needs to be determined.
FOOTNOTES TO CHAPTER II

1 Coutant and Jassey, op. cit., p. 2.

2 Educational Leadership, April, 1966, p. 601.


4 Ibid., p. 4.

5 Ibid., p. 5.


7 Guba, op. cit., p. 11.


CHAPTER III

TELEPHONE TRANSMISSION CHARACTERISTICS
AND FOREIGN LANGUAGE PERCEPTION

The immediate reaction of most persons concerned with foreign language teaching when the subject of telephone instruction is mentioned is one of immediate concern with the adequacy of telephone transmission. Most persons are concerned with the frequency response of the telephone and its limitations on possible student perception of salient phonetic features of the foreign language.

It therefore seems relevant to investigate some of the physical properties of both the telephone and human speech, some of the factors involved in the perception of speech and the theoretical and practical applications to foreign language instruction.

From the outset it should be understood that the transmission characteristics of the telephone are purposely distorted to accommodate as many speech circuits as possible within a given system. The major factors involved in speech transmission and perception via telephone are noise, amplitude, and frequency bandwidth.
Since the ability to speak the foreign language is one of the primary objectives of modern foreign language education, transmission fidelity of a medium becomes important since production depends upon accurate perception. It is important, therefore, to discuss the theoretical implications of the inherently low fidelity of the telephone and then to subject the medium to empirical testing to determine if it is adequate in actual classroom situations.

It must be remembered that the telephonic medium is proposed as a means of instruction when no teacher is available. It is never envisioned as a substitute for an actual foreign language class. Therefore, the criterion of adequacy is the "acceptability" of student speech rather than a comparison with classes taught under the direction of a "live" teacher.

**NOISE**

In communications, noise is defined as "... all sounds which are not speech ..." and has a marked effect upon the perception of speech.

Noise in telephonic communication is the sum of a variety of sound sources including inductive effects with other electrical transmission lines, noise generated within the telephone system itself, and "background" noise at the transmitting and receiving locations.

Good engineering and low noise circuitry reduce the first two sources. In the bandwidth transmitted by telephones,
average room noise varies from zero to 20 decibels (db) while street noise averages +5 to +40 db. 4

Sound reproduction of a telephone handset is always less than unity to reduce the effects of noise. The voice level at the listener's ear is less than the actual level of the speaker's voice. Since equipment used in tele-learning is of high amplification, it should be necessary to provide a quiet location for the teacher and to reduce extraneous noise in the classroom. Close proximity of microphones and loudspeakers in high gain equipment causes feedback with subsequent self-oscillation producing "ringing" or "squeals."

**AMPLITUDE**

While it is evident that force of production and acuity of perception of speech will vary among individuals, there exist consistent and measurable speech levels for individual phones across the whole speech spectrum. This is illustrated in Figure 1.

Peter Denes and Elliot Pinson of the Bell Telephone Laboratories state that a 700 to 1 range of intensities exist between the weakest and strongest sounds at a normal conversational level. 5

Commercial telephone circuits are "equalized"; that is frequencies of lower intensity (higher frequency) are amplified more than sounds of higher intensity (lower frequency), resulting in a more level curve. 6
FIGURE 1

FREQUENCY-POWER DISTRIBUTION OF SPEECH

Adapted from Harvey Fletcher, Speech and Hearing in Communication, p. 78.
FREQUENCY RESPONSE

"... in wire telephony a frequency band extending from 300 to 3000 cycles is used, and the information rate, in the sense that unpredictable signals are employed, is relatively high."\(^7\)

This restricted bandwidth provides consistent communication in the native language and is considered as "Good Commercial Speech" by Atkinson who observes:

... within the frequency range necessary for good articulation (say 500–2500 c/s), the ear has the maximum range of volume response. ... A broadening of this band to the limits of 200 and 5000 c/s will add a little to the articulation efficiency, and will materially improve the naturalness of the transmitted speech."\(^8\)

Peter Ladefoged in his Elements of Acoustic Phonetics notes that, "An ordinary telephone does not pass much energy below 300 cps. Although this will affect the quality of the sound ... the perceived pitch will remain the same."\(^9\)

"Naturalness," caused by the specific vocal mechanisms and mannerisms of the individual, is not necessary to good communication. Therefore, the most serious problem that may curtail the teaching of languages by telephone is the loss of frequencies above 3000 cps.

Extensive precise research has been done on the frequencies and intensities of various speech sounds and the effect of these on speech perception. Most available research has been done in English.
Scientists involved in the development of the sound spectrograph have experimentally determined that the information needed for speech analysis is contained in the range below 3500 cps after having worked with a range as high as 11000 cps.¹⁰

VOWEL TRANSMISSION

It will be noted that in discussions of frequency range, amplitude, and speech perception much more attention and research has been devoted to consonantal sounds than to vocalic. This may be due to the greater variety, the greater number and the more obvious role consonants play in phonemic contrasts. For purposes of evaluation of foreign language instruction by telephone it is essential to remember that telephone transmission of vocalic sounds is essentially of high fidelity.

The amplitude of the vowel sounds is the highest and therefore the most easily picked up and reproduced by electromechanical devices.

In addition since vowels are direct harmonics of the low frequency vibrations of the vocal chords, the formants essential for good perception are contained within the range below 3,000 cycles per second. While most precise data are available for English,¹¹ research indicates that all languages are essentially the same in this respect.¹²
Therefore, it can be assumed that perception of vowels by both student and teacher in a tele-learning situation will be probably more related to several other factors than to inherent telephone reproduction. These include the mechanical problems of electrical component placement and system gain, but primarily the tolerance parameters of both the students and the tele-teacher.

CONSONANT TRANSMISSION

Reproduction and transmission of consonantal sounds is of much greater concern to engineers and linguists since the frequency range of consonants is relatively high and the amplitude correspondingly weak. This is well illustrated in the data in Figure 2.

Dr. Harvey Fletcher, former Acoustic Research Director of the Bell Telephone Laboratories, comments on the perception of individual phones:

... the consonants are usually harder to recognize than the vowels. ... the sounds th, f, and v are the most difficult to recognize. The sound z, ... readily recognized at normal intensities, becomes very difficult at weak intensities. ... for intensities commonly used in conversation the sounds v, f, and th count for more than half of the mistakes in recognition of the fundamental speech sounds. ... The fricative sounds are seriously affected by the elimination of high frequencies. The elimination of frequencies above 3000 reduces the articulation of the sound
FIGURE 2

COMBINED CHARACTERISTICS OF THE FUNDAMENTAL SOUNDS OF SPEECH

Adapted from Harvey Fletcher, *Speech and Hearing in Communication*, p. 87.

It will be noted that several symbols occur more than once, indicating several concentrations of amplitude and frequency.
"s" to 40 percent, the sound "th" to 66 percent, the sound "z" to 80 percent, the sound "t" to 81 percent and the sound "f" to 85 percent. All other sounds are reduced less than 10 percent by the elimination of this frequency range. The pure vowels, the diphthongs, and the semi-vowels are affected only a negligible amount... for the unvoiced stop consonants the frequencies in the region of 1000 and 3000 cycles are the important ones for carrying recognition properties. . . .

Fletcher's research is supported by Curry in The Mechanisms of the Human Voice, who says, "The voiceless fricative consonants . . . show a great deal of high frequency structure over the range of 2,500 to 8,000 cycles or higher."15

REDUNDANCY IN SPEECH PERCEPTION

In their book The Speech Chain, Peter Denes and Elliot Pinson show that in addition to specific individual sounds and formant transitions, speech perception is strongly influenced by duration, stress, and redundancy. This last, acoustic, linguistic, and semantic redundancy strongly affects perception of speech. As these scientists point out:

Most important of all, we know the language we are listening to: we know its phonemes, its words and its grammar. We know what phoneme sequences make up meaningful words and how the rules of grammar and semantics determine word order.

Few people realize how narrowly these rules restrict the order in which phonemes can follow one another, and how strongly our knowledge of possible sequences helps us fill in any gaps in a stream of words we hear . . . 16
Cruz A. C. F. Hardigree in a doctoral study at the Ohio State University in 1957 showed the factors which involved intelligibility in the transmission of Spanish to native speakers. These were (1) position of the accented syllable, (2) the number of syllables, (3) termination of words in vowels or consonants, (4) the occurrence of consonant-vowel combinations over vowel-consonant combinations, and—lastly—(5) the presence of particular sounds.  

This knowledge of the inherent redundancy of a language is one important factor which is denied the learner of a foreign language via any mode and seriously inhibits acquisition while permitting the intrusion of native language habits as interference.

FOREIGN LANGUAGE TRANSMISSION

While superficially all languages contain different sound systems, all are produced and received by the human vocal and auditory tract and are thus limited in their physical properties.

If one can disregard the possible inclusion of languages which contain "clicks", implosives, and whistles, it would seem that the telephone would transmit all information necessary to perception by the native speaker of the language in use. This may prove to be inadequate for pedagogical purposes.
Dr. Jack Frymier observes, "Receiving stimuli is one thing. Perceiving them is another. . . . Perceiving means that the organism gives meaning to a stimulus which it receives." Therefore, while both participants in a telephone exchange may receive the actual physical stimulus of speech sounds, they may misperceive them due to ignorance of important cues, misinterpretation of received data or misapplication of identification and tolerance parameters.

The foreign language educator is most concerned with two problems, the transmission of unfamiliar sounds and the transmission of unfamiliar sequences of sounds. Reproduction by the student is contingent upon adequate perception of both.

With the careful planning and slow introduction of new material followed by much repetition that is characteristic of modern foreign language teaching, students will not be exposed to long sequences of unpredictable sounds. To the contrary, since the vocabulary is so limited the predictability of sound sequences should be quite high after initial presentation.

Some languages may lend themselves more to telephone transmission than others, depending, possibly, on the amount of high frequency sounds and the voicing of initial and final consonants. Buka, Freeman, and Locke of the Massachusetts Institute of Technology have reported:
As a result of experimentation we find that the ability of beginning students to distinguish and repeat syllables decreases markedly in German and perceptibly in French as the frequency response of equipment is progressively reduced from 7300 cycles per second, to 5000 and 3000.19

Spanish, in American usage, does not contain the high frequency, low amplitude sounds /θ, 杳, v, z/ while /f/ and particularly /z/ are of low frequency while the latter is allophonic.

A sample of "pedagogical Spanish", Dialogues 1 and 6 of Modern Spanish,20 shows /s, n, t, m, k, l, r/ and /y/ to be the most commonly used consonants, appearing three times as often as all other consonants combined. This is shown in Table 2.

### TABLE 2

**FREQUENCY OF SPANISH CONSONANT SOUNDS.**

**MODERN SPANISH, DIALOGS 1 AND 6**

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>s 143</td>
</tr>
<tr>
<td>2.</td>
<td>n 118</td>
</tr>
<tr>
<td>3.</td>
<td>t 104</td>
</tr>
<tr>
<td>4.</td>
<td>m 76</td>
</tr>
<tr>
<td>5.</td>
<td>k 70</td>
</tr>
<tr>
<td>6.</td>
<td>l 68</td>
</tr>
<tr>
<td>7.</td>
<td>ṭ 68</td>
</tr>
<tr>
<td>8.</td>
<td>p 36</td>
</tr>
<tr>
<td>9.</td>
<td>ŋ 29</td>
</tr>
<tr>
<td>10.</td>
<td>d 28</td>
</tr>
<tr>
<td>11.</td>
<td>ñ 27</td>
</tr>
<tr>
<td>12.</td>
<td>w 14</td>
</tr>
<tr>
<td>13.</td>
<td>ġ 13</td>
</tr>
<tr>
<td>14.</td>
<td>f 11</td>
</tr>
<tr>
<td>15.</td>
<td>j 10</td>
</tr>
<tr>
<td>16.</td>
<td>b 9</td>
</tr>
<tr>
<td>17.</td>
<td>չ 8</td>
</tr>
<tr>
<td>18.</td>
<td>x 7</td>
</tr>
<tr>
<td>19.</td>
<td>ș 7</td>
</tr>
<tr>
<td>20.</td>
<td>ɲ 5</td>
</tr>
<tr>
<td>21.</td>
<td>z 4</td>
</tr>
<tr>
<td>22.</td>
<td>R 4</td>
</tr>
<tr>
<td>23.</td>
<td>ŋ 1</td>
</tr>
</tbody>
</table>
Of the highest occurring group, only /r/ is among Bowen and Stockwell's "Spanish Consonants Whose Mispronunciation by English Influence Can Cause Misunderstanding." /s, n, k, l/ are among the consonants "... Whose Mispronunciation ... Results in a Heavy Foreign Accent." 21

The most frequently occurring sound in the sample /s/, is also the one which loses sixty percent of its qualities in telephone transmission. However, Bowen and Stockwell observe, "The Spanish /s/ in Latin America is not much different from the English /s/ ... ." 22

It would seem that an analysis of both the native language and the target language would be important in selecting languages for telephonic teaching.

Included among the main objectives of the telephone teaching experiment are (1) observation of the students to determine if they are able to perceive significant sounds via the telephonic medium and (2) to what extent, if any, compensation can be made by brief and simple directions for articulation in English. Also important (3) will be the ability of the teacher to perceive student error.

Since the demonstration is heuristic, frequent classroom observation by the observer kept the tele-teacher informed of problems not readily discernable over the telephone circuit. Tape recordings were analyzed for persistent student errors and production problems of lessons.
FOOTNOTES TO CHAPTER III

3. Ibid., p. 98.
4. Ibid., p. 105.
17 Cruz A. D. F. Hardigree, "Effects of Selected Phonetic Aspects in the Transmission of the Spanish Language."


19 M. Buka, M. Z. Freeman, and W. N. Locke, "Language Learning and Frequency Response."


22 Ibid., p. 58.
CHAPTER IV

THE SETTING AND PERSONNEL OF THE EXPERIMENT

The experiment in teaching a modern foreign language by telephone was conducted in the Lincoln Elementary School, Gahanna, Ohio, over an eight week period extending from late October to mid-December, 1966.

Gahanna, a rapidly growing suburb northeast of Columbus, Ohio, while legally contiguous, is physically separated by thinly populated agricultural land and the Port Columbus air facilities. The Lincoln Elementary School, located on Havens Corners Road is approximately one mile from the end of the main run-way of this major airport. Aircraft noise is very noticeable at times and will be mentioned in subsequent portions of this study.

The school itself is a one-story modern plant constructed in 1961 with a staff of twenty-three teachers from kindergarten through the sixth grade. The distance from the school to the point of origin of the tele-lesson is approximately ten air-line miles.

Throughout the course of the experiment complete cooperation and much assistance was given by school administrators and interested faculty. Mr. Edwin Rarey, Principal,
stated that the school had in former years had a program of foreign languages in the elementary school but had reluctantly dropped the program due to staffing problems.

THE CLASSROOM SETTING

The telephone Spanish class was located in Room 120, a self-contained classroom of standard size of cinder block construction and exposed steel girders. The room itself is typical of many American classrooms.

THE TELEPHONE EQUIPMENT

For the duration of the experiment the classroom was equipped with a standard model telelecture unit leased from the Ohio Bell Telephone Company.

A private leased telephone line (471-1223) was installed, entering through a window casing and terminating in the telelecture unit which was placed on a small table near the front of the classroom. The two large loudspeakers furnished with the equipment were located at a height of about three feet on opposite sides of the classroom on existing furniture.

The single omni-directional microphone, designed to be hand-held by responding students, was suspended by its wire in the center of the room from an exposed girder. A few days later a second microphone was installed in parallel with the original providing a greater pick-up area but at reduced sensitivity.
At the tele-teacher's station a standard "Hands-Free" telephone was installed on an un-listed telephone line (293-7330) used for news service by WOSU Radio. This line was reserved for the experiment use by the staff of WOSU and extended a few feet to terminate in the little used Studio B. The tele-teacher had to arrange his equipment daily on a small table, pickup unit to his front, receiving unit on a smaller table to his right. Ample space was provided for books and papers. For details see Appendix VII, "Photographs."

THE STUDENT POPULATION

Upon the advice of Mr. Maynard Bauer of the Student Field Experience Office of the Ohio State University, it was decided to select the sixth grade for the experimental population.

This decision was influenced by the ability to locate an unbiased population with little or no contact with foreign language learning, the smaller disruption caused by modification of the daily schedule by the intrusion of the experiment, and the ability to generalize findings to both the elementary and secondary schools.

The Lincoln Elementary School practices homogeneous grouping in the middle and upper grades. The student population selected consisted of the middle group of three self-contained sixth grade classrooms.
The class consisted of thirty-three students, thirty-two at the beginning of the experiment with the addition of one transfer student during the second week of instruction.

Statistical data on the class are shown in Table 3. Examination of cumulative records showed no students with a recorded hearing problem. However, two students were absent from the Spanish class for a few minutes twice weekly to receive speech therapy for English production problems. No speech problems were observed when these individuals spoke Spanish.

TABLE 3

STUDENT POPULATION

<table>
<thead>
<tr>
<th>Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>17</td>
</tr>
<tr>
<td>female</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
</tr>
</tbody>
</table>

Age (at conclusion of experiment)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>11 yrs., 1 mo.</td>
</tr>
<tr>
<td>high</td>
<td>12 yrs., 7 mos.</td>
</tr>
<tr>
<td>mean</td>
<td>11 yrs., 6 mos.</td>
</tr>
</tbody>
</table>

I. Q. (Henmon-Nelson, N 19)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>90</td>
</tr>
<tr>
<td>high</td>
<td>126</td>
</tr>
<tr>
<td>mean</td>
<td>105.6</td>
</tr>
</tbody>
</table>
The class was engaged in a study unit on Mexico when the Spanish telephone instruction began. It was determined by student questionnaire, taken before the students were aware of the experiment, that one of the original thirty-two previously studied Spanish. The one student who indicated "YES" on the questionnaire revealed under casual questioning to have learned a few phrases from his older sister, when she was in the fifth grade and he in the first. This experience was discounted.

The single transfer student had received over a year of Spanish instruction via television in the Anaheim, California, public schools. For this reason, his final examination was considered invalid.

THE CLASSROOM TEACHER

The regularly assigned sixth grade teacher was Mr. Daniel Lister, beginning his third year of teaching after several years experience in public social welfare work. Mr. Lister is regularly certified under Ohio law and a graduate student in education at the Ohio State University.

Mr. Lister was regarded by his supervisors as an excellent teacher, a fact confirmed by observers throughout the experiment who many times commented on his ability and rapport with the class.
Mr. Lister had no prior experience with Spanish, either as a learner or a teacher--a fact specified in contacting schools to locate a class for the experiment.

The role of the classroom teacher was conceived to be one of control, direction, manipulation and exhortation.

THE TELE-TEACHER

Mr. Manuel Pacheco, a bi-lingual speaker of Spanish and English, was selected as the telephone teacher. Currently a National Defense Fellow in Foreign Language Education at the Ohio State University, Mr. Pacheco is an experienced Spanish teacher from New Mexico. He has been a Fulbright Scholar in France and is a part-time consultant for Encyclopedia Britannica Films, Inc.

THE OBSERVER

The observer, the author, is a former teacher, administrator, and state supervisor of foreign languages for Nevada. He has taught foreign language methodology at the University of Nevada and has been associated with five National Defense Education Act Summer Institutes for foreign language teachers. He has observed hundreds of foreign language classes at all levels.

The role of the observer was to observe and assess instruction both in the classroom and the point of origin.
He served as a vehicle for feedback to the tele-teacher. The observer and the tele-teacher jointly developed the instructional program and evaluative instruments.

A number of other persons contributed less directly to the experiment, including consultants and specialists from the Teaching Aids Laboratory and WOSU Radio, both during the planning stages. It should be emphasized that at no point was the Ohio Bell Telephone Company ever involved actively in planning the experiment and only provided services regularly available to all customers.

MATERIALS

The telephone instruction was centered around the commercially available *The Adventures of Miguelito* by Charles Herbert which was made available to the experiment by special arrangement with Encyclopaedia Britannica Films, Inc.

The selection of materials was influenced by several considerations. First, the use of commercially available materials removed the possibility of criticisms of the experiment on the grounds of utilization of especially produced content. Secondly, the particular series, *Miguelito*, was designed to be taught from grades four through seven, an area in which there is a dearth of published commercial programs. Thirdly, the particular materials were known not to have been taught in the Central Ohio area, removing the possibility of prior contact by students or their contemporaries.
Miguelito consists essentially of a student booklet of visual cue sheets and a series of ten minute recordings. There are over seventy lessons in the full program.

The tele-teacher exercised his professional prerogative to adapt and supplement the materials slightly when he desired.

The experiment, in essence, consisted of a tele-teacher teaching a class of thirty-three sixth graders located almost ten miles away entirely by telephone. The linguistically naive classroom teacher served only as a control and exhortative agent. The purpose of the experiment was to assess the feasibility of such instruction in a modern foreign language.
CHAPTER V

PROGRESS OF THE EXPERIMENT

On the morning of October 31, 1966, at 10:00 A.M., Mr. Dan Lister dialed the telephone equipment, turned a switch, and brought the tele-teacher, Mr. Manuel Pacheco, into the classroom.

The experiment to assess the feasibility of teaching a foreign language by telephone originated in a discussion at a workshop on telephone instruction sponsored by the Western States Small Schools Project (W.S.S.S.P.) in November, 1963. Subsequently, the author and Mr. David L. Jesser attempted to define and establish such an experiment utilizing existing telephone facilities.¹ This attempt was the direct progenitor of the experiment reported in this document and of subsequent experimentation with telephonic instruction by the W.S.S.S.P.²

PRELIMINARY ARRANGEMENTS

Discussions with educators at the Ohio State University, in 1965 revealed an interest and a need for concrete evidence before further experimentation with the telephone as a medium of instruction. Consequently, a study was begun of the
available literature and research which resulted in the formal proposal for the experiment.

With the assistance of Dr. Edward D. Allen, Professor of Foreign Language Education, a small grant was obtained from the Graduate School of the Ohio State University using funds available under Title IV of the National Defense Education Act (PL-864) of 1958. This was used to defray the costs of telephone rental and stipend for the tele-teacher.

Final arrangements with the Student Field Experience Office, the Ohio State University, the Lincoln Elementary School, and the Ohio Bell Telephone Company were conducted in September and October, 1966.

On October 20, Mr. Lister administered a pre-experiment inventory to the students. At that time they were unaware that they had been selected to receive Spanish instruction.

Ostensibly to assist in planning the unit on Mexico, the inventory specifically sought to reveal (1) if students had prior experience with Spanish, (2) if students had common misconceptions about the Spanish language, (3) student familiarity with the telephone, and (4) the general attitude and beliefs held by students concerning the study of foreign languages in the elementary school. To measure the latter, the attitude inventory developed and used by Gertrude Moskowitz in her study of the influence of television teaching was employed. The instrument and the results are discussed in Chapter VI.
The following day the observer-director spoke briefly to the students concerning the experiment. They were told that (1) they were going to learn some Spanish and (2) that the teacher could not come to the school so the telephone would be used to bring him to the classroom. They were told (3) the Spanish teacher's name, (4) a little about the superficial nature of the telelecture equipment, and (5) of the possibility of some technical problems. They were (6) shown the text and told (7) that they would be given "Spanish" names. The explanation took less than fifteen minutes and was kept at the comprehension level of the sixth graders.

On October 25, final paper work necessary to requisition the telephone equipment through University channels was completed.

The next day Mr. Pacheco visited the school and met Mr. Lister and Mr. Rarey. In order to maintain Mr. Pacheco's anonymity, the visit was made while the class was absent from the room for physical education.

The telelecture equipment was installed in Room 120 by Ohio Bell personnel on October 27 while school was dismissed for a day of in-service teacher education. A special line was run into the room through a window casing. Power was available through the normal 117 volt A.C. line.
INSTRUCTION BEGINS

On Monday, October 31, the observer-director and Mr. Lister met before school. The equipment was checked and found to be functional. Mr. Lister was given approximately ten minutes instruction in operation of the telelecture unit. The omni-directional low-impedance microphone supplied with the unit was suspended in the center of the room from the open girder by its cord.

At 10:00 A.M. Mr. Lister had the students move their desks, arranged in five rows, together in a more compact group underneath the microphone and placed the telephone call to Mr. Pacheco. The tele-teacher then assumed control of the class and presented his first lesson.

Mr. Pacheco administered a short English spelling test designed to show student perception of "trouble" consonants as discussed in Chapter III. The balance of the first lesson was spent in choral and individual drill on the students new Spanish names as well as passive acquisition of Spanish commands and the greeting, "Buenos días."

The lesson ended at 10:32 A.M. Students seemed shy but obviously excited. As the observer left the room one girl remarked to her classmate, "I can hardly wait until tomorrow!"

Before the second lesson an identical microphone and a "Y" cable were secured from the telelecture unit in the
Teaching Aids Laboratory through the courtesy of Mr. Dave Selby, Audio-Visual Consultant. This was installed before school to expand the area of student "pick-up."

The second lesson opened with a few bars of music from the recorded materials. This practice was adopted for both opening and closing by Mr. Pacheco to set the lesson apart and to indicate termination of the program. Some noise was apparent on the telephone line.

Students were formally introduced to the text and covered part of Lesson I. Mr. Pacheco stated later that he had planned to cover the entire lesson but that he altered his lesson plan during the instructional period when he sensed student difficulties. Students were introduced to the three-phase pattern drill and were given a short listening-comprehension test.

This lesson convinced the tele-teacher of the necessity of having a well developed script for the exposition of new materials in order to preserve clarity and to avoid gaps in speech which, while normal in speech, seemed exaggerated during the tele-lesson.

By the end of the third day Mr. Pacheco had moved, without explanation, into the use of Spanish numbers when referring to visuals and the students were taught to respond to an item-substitution drill.

During this lesson both the observer at the tele-teaching station and the classroom teacher noted that while the
telephone is ostensibly a two-way device, in reality this is not true. In normal speech persons can interrupt each other due to the small pauses between syllables. When thirty-three students spoke in chorus these minute pauses disappeared due to the irregular rates of responses. Mr. Pacheco could not comment upon a response or begin the next item until the students had finished speaking.

The tele-teacher began to illustrate correct pronunciation through the use of brief allusions to articulation points and to comparable English sounds (i.e., /ð/ was illustrated with English "the").

During subsequent lessons Mr. Pacheco learned to operate a tape recorder and speak to the class simultaneously. After two weeks it became apparent that the recorded material did not lend itself to telephone transmission. Voices were often unclear, at a higher pitch than the tele-teacher, and some drills overly long. For ease of operation it was necessary to dub the commercially recorded materials from record to tape with some degradation of quality. The principal criticism of the instruction by the students was the difficulty of hearing the recorded materials.

**STUDENT REACTIONS**

The students in the classroom reacted as if they were actually speaking to the tele-teacher in person. While Mr. Pacheco often asked the class to "speak-up" and Mr. Lister
encouraged loud responses, these were no stronger than a foreign language teacher present in the classroom would have expected from the students.

Students responded to the tele-teacher by raising their hands to volunteer responses or to ask questions and by looking at the microphone as they spoke to the teacher. Whenever the tele-teacher referred to an individual by name, the entire class looked at the student. Students quickly learned to identify themselves in Spanish, "Yo soy ______." when speaking individually to the tele-teacher.

PRONUNCIATION PROBLEMS

It was soon noted that students had difficulty in perceiving and producing certain Spanish sounds. These errors fell into two categories, "normal" or "predictable" problems that most English speakers have when learning Spanish and other errors attributable to the lack of visual contact and telephonic reproduction.

The observer noted that certain student errors observed in the classroom were discernable at the tele-teacher's station but not perceived by him. Some variations were perceived but accepted, apparently being within the tolerance limits of the tele-teacher. Most were perceived and corrected through contrastive drills.

The students exhibited a marked tendency, fully expected by the tele-teacher and the observer, to speak Spanish
with an American accent. These pronunciation errors—substitution of similar English sounds, reduction of unstressed vowels, and diphthongation of vowels—were regarded as "normal" errors to be expected in any beginning Spanish class.

The unvoiced consonant sounds, in all positions, initial, medial, and final, proved to be the most often misperceived, followed by the "predictable" entirely new sounds of Spanish. Most often misperceived by students were /s, t, p/, final /l/, and /β, x/. The Spanish /ʃ/ presented little problem when correctly shown to the students.

These student misperceptions occurred with such regularity as to be quite predictable. The tele-teacher then could plan steps in the initial presentation to insure and check on student perception. After the second week of instruction a number of sound discrimination drills were given to the students to contrast English and Spanish sounds. Based on Bowen and Stockwell's The Sounds of English and Spanish, these proved very helpful in limiting the tendency of students to diphthongize Spanish vowel sounds.

The tele-teacher cued troublesome consonants upon initial presentation, "The last sound in delgado is like th in 'the book,' /delgatho/," or "The first sound is like s in Susita." At other times sounds were exaggerated slightly by being held for longer than normal periods, such as /x/ and /ŋ/ or initial /b/ by presenting it as /mb/. 
Finally, perception was checked by asking students, "Paco, what sound does *quiet* begin with?"

Perception problems decreased when recorded materials for follow-up were placed in the room for practice during and after the tele-lesson.

**STUDENT EVALUATION**

After the first week of instruction students were asked to evaluate and comment upon the quality of the telephone system and upon their ability to hear the teacher. They were asked to be honest and critical. Their comments and criticisms were solicited. This critique was obtained at weekly intervals except for the week of the Thanksgiving holiday. The results are also discussed in detail in the succeeding chapter.

Student criticism obtained in this manner coupled with the observer's comments caused the tele-teacher to decide to abandon the transmission of recorded materials over the telephone at the end of the third week of instruction. The observer noted that the class responded more forcefully and positively to the tele-teacher reading the script of the recorded drills than to the commercial recordings.

**MODIFICATION OF THE PROGRAM**

The class made good progress through part of the basic materials. Since the daily time allotment was only thirty
minutes and the class large, the tele-teacher planned to introduce only one or two new structures daily. After progressing into the materials the tele-teacher omitted some lessons, introduced supplementary materials, and introduced some of the more advanced units of the materials.

Students learned the common salutations, the numbers, telling time and a variety of vocabulary items. A complete list of these is given among the appendixes.

Two songs were learned, *Uno de enero* and *Noche de paz*. The latter was sung for the school Christmas program.

In the final weeks of the experiment the class learned Supplementary Dialogs 1 and 2. At this point the classroom teacher was given the phonograph record and played portions at the request of the tele-teacher. It was also available for extra-class practice.

Student motivation and interest increased markedly when the dialogs were introduced. With gestural cues provided by the classroom teacher, various groups in the class played the several parts. Eventually some students were selected to act out the entire dialog in front of the class.

The tele-teacher was able at an early stage to identify a few better than average students. The best individual in the telephone Spanish class was rated as a poor student in other areas by the classroom teacher. These individuals became at times models for the balance of the class.
Tape recordings of a number of lessons were made by the classroom teacher. To insure randomization these were left to his discretion and provided a permanent record of the verbal interaction of the class.

The telephone equipment in the room was also useful for pre-school conversations between the classroom teacher, the tele-teacher, and the observer-director. The equipment was available throughout the day and could have been used to provide other learning experiences.

Mr. Pacheco was compelled to make expositions and explanations in English since he could not act out meaning for students. The class quickly learned to respond in Spanish to Spanish directions and questions. The visuals in the Miguelito materials assisted in the avoidance of English. The use of other classroom visuals, while highly desirable, was avoided to permit evaluation of the single dimension of the telephone as a medium of instruction.

OBSEVERS

Over twenty persons observed the telephone Spanish class. These included professors of education from the Ohio State University, Franklin County supervisory personnel, several graduate students in foreign language education, undergraduate students, teachers and the Ohio State Foreign Language Supervisor.
Their comments were enthusiastic regarding student motivation and participation. Early visitors were critical of student pronunciation. Later visitors were less critical but still concerned.

CLOSE OF INSTRUCTION

On December 16th the class entered the final phase with the administration, entirely by telephone, of a Listening-Comprehension Test. Students were shown eight pictures and for each were given three Spanish sentences from which to select the one which best fitted the picture. Scores were good, one third of the class achieved 100 per cent while nineteen students missed only one item. Only three of the thirty-three missed more than one item.

The following Monday, December 19, the observer administered the Speaking Test. This test, consisting of short mimicry section to test pronunciation of key sounds and a free production test cued by visuals, took approximately two minutes to administer to each student. Both tests are discussed in detail in Chapter VI.

Recorded in advance by Mr. Pacheco and reproduced in identical copies by the "endless loop" technique, students listened to the master via earphones and spoke their responses into a second tape recorder. This enabled continuous testing and recording without rewinding and relieved scorers of the burden of listening to the master many times.
The equipment was set up on a small table in the hallway and students were tested individually in isolation. While all seemed thoroughly familiar with tape recording equipment, a few suffered from "mike fright" and their responses did not reflect their classroom performances. This was expected by the tester.

STUDENT CREATIVITY

Before the final class sessions the classroom teacher and the principal had students write a brief description and draw a picture of Mr. Pacheco--whom they had never seen--in order to foster student creativity. These proved interesting, most reflecting the stereotype of the Spanish speaker. The majority of the pupils conceived Mr. Pacheco as short, dark, and with a mustache. Few visualized Mr. Pacheco as the tall young man of twenty-five with dark hair and light complexion that he is in reality.

CONCLUSION OF THE EXPERIMENT

The final class session was held on December 20. Mr. Pacheco was contacted by the telephone as customary but at the Lincoln School office instead of WOSU Radio. After a few preliminaries and some repetitions the class was asked to sing their Spanish songs. Before they finished Mr. Pacheco entered the classroom and led the last few bars. The students were very surprised.
For the balance of the hour Mr. Pacheco answered questions and helped the class with problems including work with Noche de paz in preparation for the Christmas program.

The students were very excited, presenting Mr. Pacheco with their written descriptions and a number of hand-made Christmas cards. After the tele-teacher left the room, one boy—an underachiever in all areas but Spanish where he was the best student—remarked, "This was the best Christmas present this class ever got!"

During the Christmas recess the telephone equipment was removed and service discontinued. The class was allowed to spend several weeks of holidays and instruction before the administration of the final post-experiment attitude inventory. To remove the possibility of excitement bias, the observer had the inventory administered by the classroom teacher before the observer visited the class to thank them again for their participation.
FOOTNOTES TO CHAPTER V

1 David L. Jesser and Philip D. Smith, Jr., "A proposed Experiment to Expand and Enrich the Curriculum in Small Isolated Secondary Schools by use of Existing Telephone Facilities."

CHAPTER VI

EVALUATION

Every attempt was made during the course of the experiment to evaluate a number of factors, both objectively and subjectively, as well as to develop techniques to overcome problems encountered. In this chapter the most significant of these will be discussed in some detail.

TELEPHONE FACILITIES

While the telephone facilities utilized in the experiment are commercial circuits and units, widely tested and used, they were not designed for the application of total instruction.

Installation of the line and units by the telephone company was quickly and efficiently completed once proper administrative clearances had been obtained. Before the first class several satisfactory test calls were made.

The observer noted that the single microphone of the telelecture unit was unable to pick up adequately all student responses. This was partially solved by the installation of a second microphone but throughout the experiment the system gain of the telelecture equipment was inadequate.
The unit was designed for adequate gain with the microphone held close to the speaker's mouth. Passing a microphone from student to student is incompatible with the rapid pace and large class size of a program of total instruction. Therefore, throughout the program the tele-teacher's reception of the student's responses, especially those of individuals, was at a low volume.

Student reception, on the other hand, was much better. The voice of the tele-teacher was at an adequate level and easily heard by most students.

At several times there was extraneous noise and static apparent at both ends of the system. While no attempt was made to establish the causes, a high degree of coincidence was noted between increased noise and snow or rainfall. At only one or two times during the experiment was static a serious problem in perception at either end of the circuit.

Students were asked to evaluate the quality of transmission on a weekly basis except for the week of the Thanksgiving holiday and the final week. The results of their evaluation are illustrated in Table 4.

Students were asked to be honest and careful in their evaluation. Names were not required on the evaluation sheet although many students elected to write them.

One visitor asked if those students who did most poorly were also those who could not hear well. Accordingly, the
TABLE 4

STUDENT QUESTIONNAIRE (Mean N 31.5)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Mean of weekly responses</th>
<th>Percentage of class responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I could hear the Spanish teacher: VERY WELL</td>
<td>13.5</td>
<td>43.</td>
</tr>
<tr>
<td>ALL RIGHT</td>
<td>15.7</td>
<td>50.</td>
</tr>
<tr>
<td>NOT VERY WELL</td>
<td>2.3</td>
<td>7.</td>
</tr>
<tr>
<td>2. Noise from outside the room bothered me: A LOT</td>
<td>0.</td>
<td>0.</td>
</tr>
<tr>
<td>A LITTLE BIT</td>
<td>5.5</td>
<td>17.5</td>
</tr>
<tr>
<td>NOT AT ALL</td>
<td>26.</td>
<td>82.5</td>
</tr>
<tr>
<td>3. The Spanish teacher's voice was: TOO LOUD</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>JUST RIGHT</td>
<td>27.</td>
<td>86.</td>
</tr>
<tr>
<td>TOO LOW</td>
<td>4.</td>
<td>13.</td>
</tr>
<tr>
<td>4. Noise from the rest of the class bothered me: A LOT</td>
<td>5.</td>
<td>1.5</td>
</tr>
<tr>
<td>A LITTLE</td>
<td>11.3</td>
<td>36.</td>
</tr>
<tr>
<td>NOT AT ALL</td>
<td>19.7</td>
<td>62.5</td>
</tr>
<tr>
<td>5. There was noise from the telephone speakers; squeals, pops, hum: A LOT</td>
<td>1.3</td>
<td>4.2</td>
</tr>
<tr>
<td>A LITTLE</td>
<td>18.</td>
<td>57.</td>
</tr>
<tr>
<td>NONE</td>
<td>12.</td>
<td>38.</td>
</tr>
<tr>
<td>6. I knew what the Spanish teacher wanted the class to do: SOMETIMES</td>
<td>5.2</td>
<td>16.6</td>
</tr>
<tr>
<td>MOST OF THE TIME</td>
<td>18.</td>
<td>58.</td>
</tr>
<tr>
<td>ALWAYS</td>
<td>7.5</td>
<td>24.</td>
</tr>
<tr>
<td>NEVER</td>
<td>0.3</td>
<td>1.</td>
</tr>
</tbody>
</table>
the observer was careful to note the responses of several students and their location relative to the loudspeaker.

The poorest student was found to be equidistant from both speakers about twelve feet. He evaluated the volume as "JUST RIGHT" on the next two critiques after the visitor's comment. One student was persistent in her criticism throughout the experiment, often marking the teacher's voice as "TOO LOW." This student was the closest in the class to one loudspeaker, a measured four feet, six inches. She was one of the better students in the class.

It is evident from Table 4 that the students themselves felt they could hear the Spanish teacher most of the time. Very few felt the telephone static to be significant. It is interesting to note that few felt that noise external to the classroom interfered with their perception despite the presence of many low-flying jet aircraft. The tele-teacher was able to perceive these airplanes and delayed the class several times until they had passed over.

STUDENT PERCEPTION OF "PROBLEM" SOUNDS

In order to provide the tele-teacher and the observer-director some conception of the fidelity of the telephone transmission, students were given a short English spelling test on the first day of instruction. The class was told that some of the words would be nonsense syllables and to write what was heard rather than to be concerned with meaning.
The short test, read by Mr. Pacheco, was scored and analyzed. The results of the students' perception of isolated words—divorced from context clues—is shown in Table 5.

<table>
<thead>
<tr>
<th>Word</th>
<th>Phone(s)</th>
<th>Perceived Correctly</th>
<th>Misperceived as . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. shy</td>
<td>s</td>
<td>29</td>
<td>s1 (1)</td>
</tr>
<tr>
<td>2. try</td>
<td>tr</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>3. sigh</td>
<td>s</td>
<td>13</td>
<td>f (14), θ (1), s (2)</td>
</tr>
<tr>
<td>4. thigh</td>
<td>θ</td>
<td>5</td>
<td>nothing (8), f (3), b (4), sk (1), h (4), n (1), c (1)</td>
</tr>
<tr>
<td>5. fie</td>
<td>f</td>
<td>19</td>
<td>b (7), sk (1), θ (1), sp (1)</td>
</tr>
<tr>
<td>6. die</td>
<td>d</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>7. vie</td>
<td>v</td>
<td>20</td>
<td>θ (5), s (1), b (1), f (3)</td>
</tr>
<tr>
<td>8. tie</td>
<td>t</td>
<td>10</td>
<td>h (10), f (1), s (2), nothing (2), θ (1), b (1), n (1)</td>
</tr>
<tr>
<td>9. thy</td>
<td>θ</td>
<td>3</td>
<td>z (13), d (5), s (5), nothing (1), sd (1), v (1)</td>
</tr>
<tr>
<td>10. pie</td>
<td>p</td>
<td>9</td>
<td>h (17), t (2), b (1), r (1)</td>
</tr>
<tr>
<td>11. chi</td>
<td>c</td>
<td>16</td>
<td>tr (7), s (2), cr (1), f (1), t (2)</td>
</tr>
</tbody>
</table>
While the validity of the test itself must be open to challenge on the grounds of unfamiliarity of some words or syllables to sixth grade students, the results are interesting.

It is easily apparent that out of context, /s/ was commonly perceived as /f/, /d/ most often heard as /z/, and /p/ understood as /h/. /t/ was only perceived correctly by one-third of the class while one-third mistook it for /h/. /ə/ was simply not perceived by 83 per cent of the class who either omitted it or substituted a wide variety of phones they supposed it to be.

In summary, the telephone provided the tele-teacher's voice at a very adequate volume, relatively free from static, to the Spanish class. The system transmitted the student responses at a somewhat lower, and less satisfactory, level to the tele-teacher. Student perception of some important Spanish sounds was affected by the reproduction limitations of the telephone circuits.

PERCEPTION OF SPANISH SOUNDS

It has been pointed out in previous chapters that other factors in addition to frequency response influence perception of sound. Indeed, reception is not perception.

The class was prone to misperceive, and thus misproduce, certain important Spanish sounds. Most commonly noted
by the observer throughout the course of the experiment were the following:

TABLE 6
COMMOM STUDENT MISPERCEPTION OF SPANISH SOUNDS

<table>
<thead>
<tr>
<th>Sound</th>
<th>Word</th>
<th>Perceived As:</th>
</tr>
</thead>
<tbody>
<tr>
<td>/x/</td>
<td>Julia</td>
<td>*Kulia</td>
</tr>
<tr>
<td></td>
<td>viejo</td>
<td>*vieko</td>
</tr>
<tr>
<td></td>
<td>bajo</td>
<td>*bako</td>
</tr>
<tr>
<td>/d/</td>
<td>r</td>
<td>*gorva</td>
</tr>
<tr>
<td></td>
<td>tardes</td>
<td>*tarves</td>
</tr>
<tr>
<td>/s/</td>
<td>ldpiz</td>
<td>*ldpi</td>
</tr>
<tr>
<td>/b/</td>
<td>#</td>
<td>*siente</td>
</tr>
<tr>
<td>/p/</td>
<td>#</td>
<td>*tan</td>
</tr>
<tr>
<td>/t/</td>
<td>roto</td>
<td>*roso</td>
</tr>
<tr>
<td></td>
<td>pandereta</td>
<td>*panderesa</td>
</tr>
<tr>
<td>/l/</td>
<td>#</td>
<td>*abri</td>
</tr>
<tr>
<td>/r/</td>
<td></td>
<td>*fuelte</td>
</tr>
</tbody>
</table>

The ability of the observer to view both ends of the telephone instruction led him to note that while the tele-teacher was much more quick to note student misperception, misperception was to a degree reciprocal. That is to say, the observer was able to perceive clearly at the tele-teacher's station the class' pronunciation of *gorva and *vieko because he knew they would be mispronounced whereas
the tele-teacher was unable to note them until he was informed students were making these responses.

Much of the initial perception problems were overcome by using the techniques of cueing sounds from already familiar words, using simple and brief articulatory directions, checking students perception by direct questioning, and by having the class listen to and watch better students as they pronounced the word(s) correctly. For an actual transcript of a portion of a lesson illustrating some of these techniques refer to Appendix I.

PUPIL-TEACHER INTERACTION

It was soon evident to the observer that interaction between the tele-teacher and the students was almost the same as would occur if the tele-teacher had actually been present in the classroom, hindered only slightly by the lack of visual contact.

The pupil-teacher vocal exchange was rapid and sustained (see Appendix I). The students obviously were well conditioned to respond kinesically, raising hands in response to questions over the telephone. They had to be taught to speak when they wanted to attract the attention of the tele-teacher and to identify themselves to him when he responded to their interjection. On several occasions student interruption caused the tele-teacher to immediately alter his lesson plan for the day.
Reinforcement to student responses was given vocally, both in the form of immediate modeling and correction and of praise and humor. Students undoubtedly missed kinesic reinforcement to some degree.

It had been originally proposed to do an elaborate schematic analysis of pupil-teacher oral interaction but this was later thought to be unnecessary when playback of taped lessons showed no great divergence in technique and vocal exchange than would have been provided by Mr. Pacheco had he actually been present.

RATE OF PRESENTATION

Evaluation of the rate of presentation and progression through the Spanish materials was necessarily subjective.

The Miguelito materials were designed for a daily ten minute presentation with additional time for follow-up practice. Mr. Pacheco felt after the first few lessons that ten minutes was overly optimistic and devoted considerable more time than this to each new lesson.

The class typically spent ten minutes in review and twenty minutes in the presentation and practice of new material. Orderly progression through the materials at the rate of one lesson per day was possible.

Considerable time was spent in audio discrimination drills during the initial weeks. While valuable in any beginning foreign language class, this skill was emphasized by
Mr. Pacheco at the expense of time for presenting new active structures.

Additional time was spent in checking and correcting student perception of Spanish sounds, illustrating new words with already known sounds, and giving brief articulatory directions. Much of this time would have been unnecessary had the tele-teacher been present in the class.

In reviewing tape recordings of daily lessons recorded at random by the classroom teacher (November 5 and 14, December 1, 2, 12 and 13) it was estimated that about 20 percent of the class time was spent in these types of activities. This proportion dropped noticeably when recorded materials with higher fidelity were presented in the class on disks.

Both the tele-teacher and the observer were satisfied with the progress of the class in learning new material, although both mentioned in their frequent conferences that the class would probably move faster with a Spanish teacher actually present.

Experienced teachers who observed the class commented that they felt the class progressed at a slower rate than classes taught by a "live" teacher and had somewhat poorer pronunciation.

A list of the actual phrases and vocabulary items taught is contained in Appendix V.
STUDENT ACHIEVEMENT

The primary objectives of foreign language education in the United States include the acquisition of specific language skills, the development of cultural insights and empathy, and to provide students with an opportunity to explore their interests and talents in this area of the curriculum.

The attainment of these objectives is then crucial to the evaluation of any instructional program in modern foreign languages.

During the first few weeks of the telephone instruction, several short listening-comprehension tests were administered for teaching purposes. Students were not "graded" but the results used by the tele-teacher to evaluate the presentation rate.

To climax the experiment the students were given short listening-comprehension and speaking tests to measure their achievement. The scope of the tests was limited by the experiences of the students and the amount of material presented. No formal claim can be made for either the reliability or the validity of the tests since the single administration and short form precluded significant analysis.

The types of items included are used in established standardized tests. The achievement tests were developed jointly by the tele-teacher and the observer-director and reviewed by other foreign language educators before administration during the last few days of instruction.
Listening-Comprehension Test

A test designed to measure the ability of the students to understand spoken Spanish within the realm of the students' experience was administered over the telephone by Mr. Pacheco. It consisted of eight items. For each the student saw a picture and heard three Spanish utterances. He was asked to pick the answer which went with the picture.

This class did very well on this portion of the examination. Scores and an item-analysis are shown in Tables 7 and 8. For a copy of the complete test, reference should be made to Appendix III.

TABLE 7
LISTENING-COMPREHENSION TEST SCORES

<table>
<thead>
<tr>
<th>No errors</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 error</td>
<td>18</td>
</tr>
<tr>
<td>2 errors</td>
<td>2</td>
</tr>
<tr>
<td>3 errors</td>
<td>0</td>
</tr>
<tr>
<td>4 errors</td>
<td>0</td>
</tr>
<tr>
<td>5 errors</td>
<td>1</td>
</tr>
<tr>
<td>6 errors</td>
<td>0</td>
</tr>
<tr>
<td>7 errors</td>
<td>0</td>
</tr>
<tr>
<td>8 errors</td>
<td>0</td>
</tr>
</tbody>
</table>

Total 32
TABLE 8
LISTENING-COMPREHENSION TEST, ITEM ANALYSIS

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Son las siete.</td>
<td>1</td>
</tr>
<tr>
<td>2. El autobus llega</td>
<td>17</td>
</tr>
<tr>
<td>3. Es jamón.</td>
<td>2</td>
</tr>
<tr>
<td>4. Se llama el señor Alto.</td>
<td>1</td>
</tr>
<tr>
<td>5. Miguelito es fuerte.</td>
<td>1</td>
</tr>
<tr>
<td>6. cuatro</td>
<td>3</td>
</tr>
<tr>
<td>7. Pásame la pimienta.</td>
<td>2</td>
</tr>
<tr>
<td>8. Papá lee el periódico.</td>
<td>-</td>
</tr>
</tbody>
</table>

It can easily be seen that student achievement was high and that Item 2, El autobus llega (as opposed to El tren sale and El autobus sale) separated the best students from the balance of the class.

Speaking Test

The Speaking Test was administered individually to all students with the exception of one absentee. The tele-teacher made an original recording which was duplicated to provide an identical copy for each student. Students heard the teacher's voice on tape and their responses were recorded on a second tape recorder.
The test itself consisted of two parts, mimicry production of the important sounds /#, a, t, s, l, o, y, x, tr,/ and /R/, and a free production section. A copy of the test and scoring sheet is included in Appendix III.

In the second portion of this test students were asked to look at a picture and instructed to respond in Spanish (i.e., "You are at the table and see something. Ask for it in Spanish."). There were four items of this type.

To remove possible bias, the Speaking Tests were scored by the tele-teacher and also by several skilled and experienced Spanish teachers. The production of key sounds were scored as "Acceptable" or "Not Acceptable." The free production portion was scored on a system advocated by Dr. James Taylor which permits a uniform score by several individual scorers.²

The scorers were first given two "practice" or "example" exams read by one person who speaks some Spanish and one person who speaks little or no Spanish. These served as training devices before the actual scoring of the telephone class Speaking Tests. The results of their scoring is shown in Table 9.

The scorers graded the tests separately over a four day period. Each was unaware of the scores assigned by others.

Scorer A: A non-native with nine years experience as a Spanish teacher in grades 4-12.
## TABLE 9

### SOUND PRODUCTION SCORES

<table>
<thead>
<tr>
<th>SOUND</th>
<th>Scorer A</th>
<th>Scorer B</th>
<th>Scorer C</th>
<th>Scorer D</th>
<th>Mean</th>
<th>Tele-Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accept</td>
<td>Not</td>
<td>Accept</td>
<td>Not</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>17</td>
<td>13</td>
<td>0</td>
<td>31</td>
<td>6.25</td>
<td>24.75</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>29</td>
<td>1</td>
<td>28</td>
<td>3</td>
<td>16.75</td>
<td>14.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
<td>18</td>
<td>12</td>
<td>28</td>
<td>3</td>
<td>20</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>l</td>
<td>26</td>
<td>4</td>
<td>25</td>
<td>6</td>
<td>27.25</td>
<td>3.5</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
<td>21</td>
<td>9</td>
<td>31</td>
<td>0</td>
<td>21.75</td>
<td>9</td>
</tr>
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<td></td>
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<td></td>
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<tr>
<td>o</td>
<td>28</td>
<td>2</td>
<td>30</td>
<td>1</td>
<td>22</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j</td>
<td>26</td>
<td>4</td>
<td>31</td>
<td>0</td>
<td>28.75</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
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<td>x</td>
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<td>11</td>
<td>16</td>
<td>15</td>
<td>16</td>
<td>14.75</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>tr</td>
<td>28</td>
<td>2</td>
<td>26</td>
<td>5</td>
<td>19.75</td>
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</tr>
<tr>
<td>R</td>
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<td>15</td>
<td>14</td>
<td>16</td>
<td>12.25</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MEANS**

|        | 20.7    | 9.4     | 23.4    | 7.6     | 12.5   | 18.5   | 21.1   | 9.9    | 19.36  | 11.34  | 20.2   | 10.8   |

*Did not score one test*
Scorer B: A native speaker with ten years experience as a Spanish teacher from grade seven to the university level.

Scorer C: A non-native with seven years experience as a Spanish teacher including two at the sixth grade level.

Scorer D: A native speaker with twelve years experience as a Spanish teacher from grade seven to the university level.

An examination of the scorer's independent ratings of the students' speaking tests reveals much of interest. Obviously there is much subjectivity, especially on the students' ability to produce important Spanish sounds. Scorer A was more tolerant of (â) than the other scorers but accepted only one unstressed /a/. Scorer C rejected most pronunciations of /t/ while the native speakers of Spanish differed widely on their acceptance of /o/.

In general the native speakers of Spanish were more acceptable of student pronunciation. Both reported without solicitation that they had replayed the tape recording of certain students' pronunciation of some phrases for the enjoyment of listening to good pronunciation.

Scorers A and C, non-native speaking Spanish teachers, were very critical of the pronunciation of the unstressed vowel /a/, exactly reversing the judgement of the native speakers. The study of the scoring itself would prove of
interest but beyond the purposes and scope of this present study.

The purpose of the scoring was to develop a consensus of the students' speaking ability by unbiased Spanish teachers. Three of the four means are quite similar and correlate closely with the scores assigned by the tele-teacher.

The consensus seems to be that two-thirds of the students' utterances of key sounds are acceptable.

On the Free Production portion (see Table 10) the grading of Scorers A, B, D and the tele-teacher seem quite similar. Students' mean scores range from 1 to 17.25 of a possible 20 points. Six students scored highly.

The overall Scorers' mean of 10.8 indicates that about 55 per cent of the responses given by students were accepted by the panel.

In reality, the panel consensus can only serve to corroborate the scoring of the tele-teacher. Their scoring approaches his. In the absence of a control group for comparison no direct values can be assigned student scores.

The unsolicited comments of the scorers after hearing the students' responses may mean more than isolated ratings without reference points.

Scorer A: "Their pronunciation is, on the whole, better than other classes at this level that I have observed."

Scorer B: (native-speaker) "I am very impressed--especially with the /l/."
### TABLE 10

**FREE PRODUCTION SCORES**

<table>
<thead>
<tr>
<th>Student</th>
<th>Scorer A</th>
<th>Scorer B</th>
<th>Scorer C</th>
<th>Scorer D</th>
<th>Mean</th>
<th>Tele-Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>19</td>
<td>18</td>
<td>14</td>
<td>17</td>
<td>17.19</td>
<td>19</td>
</tr>
<tr>
<td>2.</td>
<td>16</td>
<td>17</td>
<td>12</td>
<td>17</td>
<td>15.5</td>
<td>15</td>
</tr>
<tr>
<td>3.</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1.</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>11</td>
<td>8</td>
<td>4</td>
<td>9</td>
<td>7.25</td>
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</tr>
<tr>
<td>5.</td>
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<td>12</td>
<td>3</td>
<td>6</td>
<td>7.25</td>
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<tr>
<td>6.</td>
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<td>16.</td>
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<tr>
<td>10.</td>
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<td>*</td>
<td>*</td>
<td>*</td>
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</tr>
<tr>
<td>11.</td>
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<td>13</td>
<td>14.5</td>
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<tr>
<td>12.</td>
<td>15</td>
<td>17</td>
<td>11</td>
<td>11</td>
<td>13.5</td>
<td>15</td>
</tr>
<tr>
<td>13.</td>
<td>18</td>
<td>18</td>
<td>4</td>
<td>15</td>
<td>14.25</td>
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<tr>
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<td>9</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>7.25</td>
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</tr>
<tr>
<td>16.</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>4.25</td>
<td>2</td>
</tr>
<tr>
<td>17.</td>
<td>16</td>
<td>14</td>
<td>7</td>
<td>12</td>
<td>12.25</td>
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<td>18.</td>
<td>10</td>
<td>11</td>
<td>4</td>
<td>7</td>
<td>8.</td>
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<tr>
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<td>8</td>
<td>7</td>
<td>9</td>
<td>8.5</td>
<td>9</td>
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<tr>
<td>20.</td>
<td>13</td>
<td>16</td>
<td>11</td>
<td>12</td>
<td>13.</td>
<td>13</td>
</tr>
<tr>
<td>21.</td>
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<td>15</td>
<td>17</td>
<td>16.75</td>
<td>17</td>
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<tr>
<td>22.</td>
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<td>5</td>
<td>4</td>
<td>5.</td>
<td>5</td>
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<tr>
<td>23.</td>
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<td>7</td>
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<tr>
<td>24.</td>
<td>4</td>
<td>2</td>
<td>2</td>
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<td>2.25</td>
<td>2</td>
</tr>
<tr>
<td>25.</td>
<td>14</td>
<td>15</td>
<td>8</td>
<td>14</td>
<td>12.25</td>
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</tr>
<tr>
<td>26.</td>
<td>19</td>
<td>17</td>
<td>15</td>
<td>18</td>
<td>17.25</td>
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</tr>
<tr>
<td>27.</td>
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<td>13</td>
<td>10</td>
<td>10</td>
<td>11.5</td>
<td>11</td>
</tr>
<tr>
<td>28.</td>
<td>20</td>
<td>20</td>
<td>12</td>
<td>17</td>
<td>17.25</td>
<td>18</td>
</tr>
<tr>
<td>29.</td>
<td>11</td>
<td>12</td>
<td>8</td>
<td>10</td>
<td>10.25</td>
<td>10</td>
</tr>
<tr>
<td>30.</td>
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<td>12</td>
<td>8</td>
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<td>9.75</td>
<td>11</td>
</tr>
<tr>
<td>31.</td>
<td>-</td>
<td>19</td>
<td>15</td>
<td>17</td>
<td>17.</td>
<td>15</td>
</tr>
</tbody>
</table>

Mean 12.3 12.6 8.1 10.7 10.9 10.8

*no recording*
Scorer D: (native-speaker) "They are quite good—really!"

Tele-teacher: (native speaker) "Their pronunciation is not as good as I had thought it was."

Thus, the consensus of the group of experienced Spanish teachers seems to be that, considering the grade level and the amount of time of the instructional phase of the experiment, student pronunciation was what they themselves would expect and accept most of the time. Scorer C dissented while the tele-teacher felt that pronunciation would have been better had he been present in the class.

STUDENT ATTITUDE CHANGES

The attitudes and conceptions of students toward the speakers of a foreign language and toward the study of a foreign language per se are the other important areas of program evaluation. During the telephone teaching experiment an attempt was made to assess student attitude and subsequent change attributable to the program of instruction.

Before the experiment the class was administered a short AGREE-DISAGREE type inventory, ostensibly to help plan their unit on Mexico. Students did not know at that time they had been selected to study Spanish. The same inventory, in a different order, was administered three weeks after the close of the experiment. The two measures were compared statistically for significance.
No overt effort was made by the tele-teacher to change attitudes or to provide the students with factual information on Mexican life and culture. The materials used showed Mexican children dressed and acting much like American children.

While scrambled on both occasions, the inventory actually consisted of two parts, one to obtain the reaction of the tele-class to Mexico and its inhabitants and their concept of Spanish. The second was developed by Gertrude Moskowitz in her study of elementary student attitudes toward foreign languages. The two will be discussed separately.

**Conceptions of Mexico and the Spanish Language**

Students were asked to answer "Yes" or "No" at both points, pre- and post-experiment, to simple questions. Their answers are shown in Table 11. It will be noted that of the seven items, only Number 4 and Number 7 resulted in enough changes to warrant testing for significance.

Since student responses to two testings of this type are highly correlated, simple statistical tests of significance are impossible. Accordingly, Items 4 and 7 were given a $\chi^2$ test for the significance of the difference between correlated proportions based on McNemar’s estimate of the standard error of the difference between two means. To further refine the resultant $\chi^2$, Yate’s correction for continuity was included.\(^3\)
### TABLE 11

**STUDENT RESPONSES TOWARD MEXICO AND THE SPANISH LANGUAGE**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Experiment</th>
<th>Past-Experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I would like to visit Mexico.</td>
<td>Yes: 31, No: 1</td>
<td>Yes: 32, No: 0</td>
</tr>
<tr>
<td>2. I would like a Mexican friend.</td>
<td>Yes: 32, No: 0</td>
<td>Yes: 32, No: 0</td>
</tr>
<tr>
<td>3. If I had a friend in Mexico, I could call him on the telephone.</td>
<td>Yes: 15, No: 17</td>
<td>Yes: 16, No: 16</td>
</tr>
<tr>
<td>4. Mexican children are just like we are.</td>
<td>Yes: 5, No: 26</td>
<td>Yes: 10, No: 22</td>
</tr>
<tr>
<td>5. Spanish is very different from English</td>
<td>Yes: 28, No: 4</td>
<td>Yes: 29, No: 3</td>
</tr>
<tr>
<td>6. Spanish is a hard language to learn to speak.</td>
<td>Yes: 8, No: 23</td>
<td>Yes: 8, No: 23</td>
</tr>
<tr>
<td>7. I would like to study Spanish.</td>
<td>Yes: 31, No: 1</td>
<td>Yes: 26, No: 6</td>
</tr>
</tbody>
</table>
This type of test involves more than a count of pre- and post-test scores but required identification of the individual decisions made by students on both tests.

<table>
<thead>
<tr>
<th>Student Responses Pre-to Post-Test</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes-Yes</td>
<td></td>
</tr>
<tr>
<td>No-No</td>
<td></td>
</tr>
<tr>
<td>Yes-No</td>
<td></td>
</tr>
<tr>
<td>No-Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 df</td>
</tr>
</tbody>
</table>

4. Mexican children are just like we are. 4 20 1 6 2.26

7. I would like to study Spanish. 26 1 5 0 5.0* *significant beyond the .05 level.

The data clearly shows that five members of the class indicated that they changed their minds about studying Spanish over the course of the experiment. Since this represents 16 per cent of the students involved it deserves comment.

However, it is not at all unusual for this proportion of a foreign language class to find themselves "... beset by a frustrating lack of ability in this area." It has been shown by Pimsleur and Dunkle and Pillet that approximately fifteen percent of students simply lack linguistic talent. Pimsleur attributes much of this lack of achievement to poor auditory discrimination.

With the total emphasis of the telephone instruction on an audio presentation, the number of students who decided that they did not at this time want to study Spanish seems
totally reconciled to the findings of Pimsleur, Dunkle, and Pillet.

ATTITUDES TOWARD FOREIGN LANGUAGE INSTRUCTION

In 1962 Gertrude Moskowitz published the results of a study relating the attitudes of students who had studied foreign languages by television with students who had either studied with a "live" teacher or who had not studied foreign languages at all. Her work was based on a seven item inventory given to these three groups of students after the period of instruction.

In summary, Moskowitz found that students who studied a foreign language via television responded significantly differently in a negative direction to her seven item inventory than students who had never studied a foreign language at all. Moskowitz related this significant difference to the instruction the television group had received.

In an effort to relate the telephone experimental instruction to Moskowitz' findings, her seven item inventory was a central part of the telephone class pre- and post-test. A preliminary examination of the responses of her non-foreign language sixth grade students of Upper Darby, Pennsylvania, and the sixth grade non-foreign language class at Gahanna, Ohio, revealed obvious differences. These differences were serious enough to warrant statistical examination.
The responses on four of the seven items cannot be said to be drawn from the same populations. Two differ at the .001 level of confidence. While the two groups in fact are different, such wide divergence must question both the reliability and validity of the inventory and its generalizability to other populations. Complete data is shown in Footnote 4.

While the responses of the two groups are very significantly different and do not permit comparison, the telephone class responses pre- and post-experiment to the Moskowitz inventory are reliable and can be statistically tested for significance.

The pre- and post-telephone experiment responses to the inventory and significant changes are shown in Table 12. Significance was determined with a \( \chi^2 \) test for correlated proportions.\(^5\)

**SUMMARY OF ATTITUDE STUDIES**

During the telephone Spanish instruction no overt effort was made to change student opinion regarding foreign language speakers or foreign language instruction.

Analysis of student responses showed that few decided Mexican children were like themselves. The class did feel (.01 level) that studying a foreign language helped them think better.
### TABLE 12

**STUDENT RESPONSES ON FOREIGN LANGUAGE INSTRUCTION**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Student Responses</th>
<th>Pre- to Post-Test</th>
<th>$\chi^2$</th>
<th>1 df</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is easy for pupils in elementary school to learn a foreign language.</td>
<td>Yes-Yes 8 No-No 11 Yes-No 1 No-Yes 11</td>
<td></td>
<td>6.75*</td>
<td></td>
</tr>
<tr>
<td>2. Studying a foreign language helps you in English.</td>
<td>Yes-Yes 10 No-No 8 Yes-No 5 No-Yes 9</td>
<td></td>
<td>.64</td>
<td></td>
</tr>
<tr>
<td>3. Studying a foreign language helps you in other subjects in school.</td>
<td>no significant change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Pupils in an elementary school should study a foreign language.</td>
<td>no significant change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Studying a foreign language helps you think better.</td>
<td>Yes-Yes 6 No-No 11 Yes-No 2 No-Yes 13</td>
<td></td>
<td>6.67*</td>
<td></td>
</tr>
<tr>
<td>6. Studying a foreign language helps you to feel closer to people from foreign countries.</td>
<td>Yes-Yes 4 No-No 15 Yes-No 9 No-Yes 4</td>
<td></td>
<td>1.23</td>
<td></td>
</tr>
<tr>
<td>7. When a foreign language is studied in an elementary school, everybody should study it.</td>
<td>no significant change</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at the .01 level
A number (5) of students decided they would not want to pursue the study of Spanish (.05 level). One third of the class shifted their opinion during the experiment and decided that foreign languages were easy for elementary school students to learn (.01 level).
FOOTNOTES TO CHAPTER VI

1 Mary Finocchiaro. Teaching Children Foreign Languages, pp. 24-25.

2 Dr. Taylor in workshops advocates the scoring of free utterances by the assignment of 5 points to each item; less 1 point for each error noted. The balance is then totaled to obtain the cumulative score. The result is usually wide agreement by a number of otherwise subjective scorers.

3 The formula used was \( \chi^2 = \frac{(AD-BC-1)^2}{AD+BC} \) where A are changes from NO to YES and D are changes from YES to NO. Reference is made to: George A. Ferguson, Statistical Analysis in Psychology and Education, pp. 148-150 and 171-172 and to Francis G. Cornell, The Essentials of Educational Statistics, pp. 240-243.

4 The responses of the two groups were compared and \( \chi^2 \) computed to test the significance of differences.

1. It is easy for pupils in elementary school to learn a foreign language.
   Upper Darby: Yes 58 No 24
   Gahanna: Yes 10 No 22
   21.97 significant .001

2. Studying a foreign language helps you in English.
   Upper Darby: Yes 58 No 24
   Gahanna: Yes 14 No 18
   6.57 significant .05

5. Studying a foreign language helps you think better.
   Upper Darby: Yes 35 No 45
   Gahanna: Yes 23 No 8
   7.55 significant .01

7. When a foreign language is studied in an elementary school, everybody should study it.
   Upper Darby: Yes 64 No 17
   Gahanna: Yes 13 No 19
   19.65 significant .001

5 Ferguson, loc. cit. and Cornell, loc. cit.
CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

The sustained daily instruction of a class in a modern foreign language completely via telephone has provided much information needed upon which to build future, more precise, experimentation and development. The unknown factors discussed in early chapters have been illuminated.

In order to provide precision, the questions raised in Chapter II will be discussed separately.

CONCLUSIONS

1. Can a foreign language class be taught via telephone facilities?

The experiment has proven that a foreign language class can be taught entirely through the medium of the telephone. The efficiency of telephone instruction vis a vis other media has not been established.

2. Is it practical and economical for schools to expand their curricular offerings in this manner?

The telephone is a most overlooked and little used medium. Other than the one-time installation charges, costs are relatively inexpensive (see Appendix VI) on a per-pupil basis.

96
Since the telephone permits a wide geographical coverage and eliminates time spent in travel, the telephone is an economical and efficient way to extend and enrich the curriculum of a school.

3. Can immediate student feedback result in immediate modification of the instructional presentation?

This question was answered in the affirmative during the first day of instruction. The materials presented ostensibly required ten minutes of presentation per lesson. Student responses immediately rejected this rate of presentation with subsequent modifications in the instructional program.

4. Is such modification an asset that cannot be supplied by other media?

The ability to perceive the students' responses, to sense their difficulties, to insert new materials, to praise and to chide individuals is one advantage that telephonic instruction shares with the actual presence of a teacher, a feature not yet enjoyed by other media.

5. Is the frequency response of telephone equipment good enough to permit the students to perceive adequately the sounds of a foreign language?

The experiment showed that the fidelity of telephone reproduction was not adequate to perceive important sounds in a foreign language when they were presented entirely by telephone. When the presentation was supplemented by high
quality recordings in the room followed by practice conducted by telephone, student perception seemed to increase noticeably.

6. Is it possible to use a minimal amount of articulatory information to partially compensate for the inherent poor response of telephone communications?

The tele-teacher was very successful in cueing Spanish sounds from reference to simple articulation points, by reference to already known sounds of Spanish and English, and by having the class listen to and observe the better students.

7. Are students motivated by and responsive to a telephonic presentation?

The high motivation level and obvious enthusiasm of the class was the most frequently commented upon aspect of the experiment. The observer, classroom teacher, and principal felt it to be very high. Every visitor commented upon the students' enthusiasm.

Students raised hands to address the microphone, volunteered eagerly, smiled when spoken to, and expressed regret at not being called upon. Participation was at a high level and students became very involved during each daily lesson.

8. What are some of the problems that arise because of lack of visual contact on the part of the teacher?

The lack of visual contact hindered both communication and presentation. Students are conditioned to raise hands
and had to be trained to speak when they wished to attract the attention of the tele-teacher.

The inability to act out meaning forced the tele-teacher to use more English to insure student comprehension than he would have employed in situ. Both the tele-teacher and the observer felt that the amount of English employed could have been reduced considerably if different instructional materials, particularly utilizing more elaborate visuals (i.e., filmstrips, motion pictures), had been employed.

9. Should future studies attempt to provide video transmission?

The transmission of images from the tele-teacher to the class would have been highly desirable and would eliminate the need for separate visuals for each classroom as well as to provide greater dimensions of meaning and rapport.

Telewriter equipment would permit transmission of sketches but a medium such as the picture-phone or slow-scan television would transmit prepared and detailed visuals as well as occasional views of the tele-teacher.

10. What are some of the technical problems encountered?

While the Ohio Bell Telephone Company was always willing to offer their services when asked, their participation in the experiment was always passive. Ideas always originated with the experimenters.
System gain at the individual student level was too low with standard telelecture equipment. There was adequate volume of the incoming program.

Simultaneous two-way speech can be effected despite the automatic "one-way" transmission of the telephone because of the rapid switching between speakers at a syllabic rate. With a class in chorus there exist no minute gaps between sound segments and the teacher cannot interrupt or stop the class during an utterance.

At times there was some static noticeable on the telephone line, seemingly heavier during days of rain or snow. Static did not seem to be reciprocal. Only on one occasion during the experiment did line noise seriously impede the progress of a daily lesson.

11. What are some of the administrative problems encountered during the experiment?

At the school and classroom level administration was extremely easy. Since the program could begin or end with a few minutes leeway, the classroom teacher was seldom forced to interrupt other activities. Since the lesson began when the students were ready, the class never participated in only a portion of the daily presentation.

12. How many personnel must be involved in adequately presenting the material?

The tele-teacher was able to do the complete presentation, including manipulation of the telephone equipment,
text, materials, and tape recordings. The only problem encountered was a lowering of volume when the tele-teacher turned his head to manipulate the tape recorder.

13. How much preparation must be done in proportion to actual "on-the-air" time and is this comparable to the preparation required by ordinary ETV?

Throughout the instructional phase of the experiment the tele-teacher spent approximately one hour daily preparing for the thirty minute class. Additional time was spent going from his office to the studio, in arranging the telephone equipment—required daily—and in tape duplication. Total time thus equaled about ninety minutes preparation for thirty minutes presentation.

Approximately fifteen to twenty hours of preparation is required to produce a single thirty minute television lesson.¹ While the use of commercially available materials by the telephone experiment excluded much time spent in production, it did permit instant program modification and revision.

The combination of telephone and video transmission will increase preparation time.

14. Do students receiving foreign language instruction via the telephone develop a generally negative attitude toward foreign languages?

The class maintained or strengthened their attitude toward foreign language instruction during the telephone
teaching experiment. While a few individuals decided personally they did not want to continue to study a foreign language, such was an expected outcome of instruction at this level.

The class felt very strongly after the experiment that it was easy for elementary school students to learn a modern foreign language. Many individuals thanked both the tele-teacher and the observer for providing the instruction.

16. Can presentations be recorded in the remote classroom for later practice and review?

Six class sessions were recorded in toto for review and analysis. Recording was simple and straightforward and any desired material could have been placed on tape for the class.

17. Will some students not be able to learn via telephone?

Apparently five of the thirty-two members of the class were to some degree frustrated by the telephone experience. Only a few students did poorly on the final Listening-Comprehension Test with only one student scoring very low.

The number of students not doing well—even in their own perceptions—is not higher than the proportion to be expected in any beginning foreign language class.2

It would seem that the medium per se cannot be responsible for lack of these students' success.

18. Will telephonic instruction help to change stereotyped concepts of speakers of foreign languages?
The experiment involving the students' concept of the tele-teacher illustrated that stereotyped concepts were maintained by students. Since cultural insights are a primary objective of modern foreign language teaching, it seems that change of concepts must be done by more overt methods than language instruction per se.

AFFIRMATION OF HYPOTHESIS

It is believed that the experiment detailed in this study, as evidenced in the accomplishment of the objectives established, confirms the stated hypothesis formally advanced: "It is possible for a foreign language teacher to conduct a class effectively via amplified telephone equipment using regular, commercially available, instructional materials."

While it has never been maintained that such instruction replaced the presence of a teacher, this point should be reaffirmed. The class undoubtedly would have done more and better with the Spanish teacher present.

In situations where the physical presence of a teacher is not possible, the telephone with associated supporting materials can provide a meaningful experience for students.

RECOMMENDATIONS

In reviewing the study and the conclusions reached on express questions, as well as discussions among personnel
involved in the experiment, many ideas have presented themselves for future telephone instruction.

In light of the many educational uses now being made of the telephone as reported in Chapter I, it would seem a minor matter to provide the necessary circuitry to connect one of the regular school telephone lines to the already existing school intercommunications system. This would provide every classroom with a high potential instructional medium.

The telephone might be used at advanced levels of foreign language instruction or for follow-up of material presented either in person or by high fidelity equipment. Students would do better with initial presentation of sounds by some other medium.

The telephone could be used, even in urban areas, to provide enrichment, homework practice, and advanced instruction.

The telephone might be used in conjunction with television to provide for student feedback and monitoring of responses by the television teacher. Even on large scale broadcasts random classrooms could be connected via telephone to provide the teacher with some student reactions.²

Future telephone instruction should utilize high quality audio-visual materials with films and recordings manipulated in situ by the classroom teacher both during the telephone presentation and for later practice.
Telephone specialists could take a much more active and leadership role in encouraging educational applications of their facilities, including engineering and production of telephone facilities for school and classroom use. Throughout the telephone foreign language experiment, telephone consultants played an essentially passive role.

Future telephone foreign language classes should use individual operator's headset-microphone combinations or multiple "hands-free" units instead of telelecture equipment. This is essential to complete pupil-teacher interchange, to exclude extraneous noise, and to insure adequate pick-up of every student's responses. The freedom of instantaneous interruption at adequate volume levels is impossible with telelecture equipment.

Slow-scan television, permitting video transmission over telephone lines, should be tested for classroom applications by educators and telephone engineers. Many educators have seen the potential in slow-scan television but have received little cooperation from industrial developers.

The telephone could provide total or supplementary modern foreign language instruction into every student's home, perhaps eliminating homework discs.

Most important of all, when the curriculum of a school is enriched by the more widespread utilization of foreign language teacher by amplified telephone, provision should be
made for regular extra-telephone monitoring of student pro-
nunciation by the telc-teacher—possibly by tape recordings
but preferably by periodic personal classroom visitation.

SUMMARY

A modern foreign language can be taught over telephone
facilities. Any school having moderate financial resources
can provide instruction in this area by sharing a teacher
not able to be physically present in the classroom.

An important factor inhibiting modern foreign language
instruction is the lack of specialist teachers in many areas.
The telephone can provide a medium through which to extend
and expand the teaching services of competent individuals.
FOOTNOTES TO CHAPTER VII


2 Ibid., p. 204.
APPENDIX I

TRANSCRIPTION OF A PORTION
OF A TELE-LESSON
TRANSCRIPTION OF A PORTION
OF A TELE-LESSON

November 5, 1966

The class has been practicing counting to ten)

Pacheco: Muy bien. Abran los libros a la lección cuatro. (rustle of pages turning) Remember that in this lesson Miguelito has come to one of the side shows where all the . . . the attractions are--the fat man, the tall man, et cetera. Now, if you'll remember, each one of these people introduces himself to Miguelito. I'm going to call out the number in Spanish and you tell me what each person says to Miguelito. Do you all understand?

Class: Sí.

Pacheco: ¿Están listos?

Class: Sí.

Pacheco: Muy bien. Uno.

Class: Yo soy la señora gorda.

Pacheco: Yo soy la señora gorda. Todos.

Class: Yo soy la señora gorda.

Pacheco: Muy bien. Dos.

Class: Yo soy la señora delgado.


Class: Yo soy el señor delgado.

Pacheco: Muy bien. Yo soy el señor delgado. Tres.
Class: Yo soy el señor *bako.
Pacheco: Yo soy el señor bajo.
Class: Yo soy el señor *bako.

050 Pacheco: We're having trouble with some of these words again. El señor. Todos. El señor.

Class: El señor.
Pacheco: Put the tip of your tongue a little bit further to the front. . . . el . . . el señor. Todos.

Class: El señor.
Pacheco: Señor.
Class: Señor.
Pacheco: El señor.
Class: El señor.
Pacheco: El señor (stressing ň).
Class: El señor.
Pacheco: Muy bien. Otra vez. Yo soy el señor bajo.
Class: Yo soy el señor *bako.
Pacheco: Bajo (stressing /x/). Do you remember that? Bajo. Todos.

Class: Bajo.
Pacheco: Muy bien. Yo soy el señor bajo.
Class: Yo soy el señor bajo.

057 Pacheco: Muy bien. Cuatro. . . .
APPENDIX II

STUDENT COMMENTS
STUDENT COMMENTS - 1st WEEK
Random Order - Spelling Uncorrected

1. "I liked numbers and side show."

2. "That there was no noisy from the specer (speaker)."

3. "I liked the lesson very well because you learn a lot about Mexico."

4. "I thought the lessons were very. But you are going too fast through each lesson. I am not able to learn so fast. But the (y) are very fun, for one reason by all the sounds we make, and the way by do it."

5. "I think that Mr. Pacheco should give us our tests insted of the recorder. Then we could hear them better. Today I answered all my questions. Mr. Pacheco talk plainer than the recorder. I also like counting to ten in Spanish."

6. "Every time you turn on the record I could not hear the record very plain."

7. "At the begining of week mosiy (noisy) was a little bite."

8. "I could hear are teacher good but not the recorder. And some of those names are hard."

9. "I do not like it when we have to say our names. The reccordings were not clear."

10. "The records of instruction didn't come out to clearly. Sometimes I didn't get the instructions right. Senor Pacho talked just right most of the time."

11. "The recording was not clear and to fast."

12. "The good thing I like was when the boy went to the circus and met fat, thin, tall, Short, old, Strong people."

13. "I enjoyed them."

14. "I thought last weeks lesseeon was very good. I had no trouble."
15. "I got mixed up in counting uno to dez. And the rest of the lessons were alright to me but I don't know about the other classmates."

16. "I liked it last week because I could hear hear very well and I like the music. I like him to ask questions to just one person."

17. "Well it's been very. I like it because we learned new things last week, but I couldn't hear him very well."

18. "I liked it when we learned to count in Spanish."

19. "I liked last week's lesson because I thought that we spoke loud enough. And we could hear you very well."

20. "I couldn't hear very good last week. But I could hear a little better, and it came over more clearly today."

21. "I couldn't understand the recordings but most of it was good."

22. "I couldn't hear the numbers very well on the tape recorder. Otherwise it was very good."

23. "I heard him very good last week."

24. "Some of the words weren't to clear."

25. "The recordings are too fast for the tests. I can hear Sin. Pacheco good but not the recordings for the tests. I like to learn the numbers but not the names."

26. "The good thing I learned was to count and it came over clearly. The bad thing the machine wasn't clear and some times when a plane went by the voice got lower."

27. "I get mixed up when the class has a different answer than I. All is good."

28. "I like when he pronounce the word they came in good sometimes, and some not to good."

29. "Every thing was all right last week and I have no complaints the teacher speaks very good and I can understand the tapes."

30. "1. The circus people names are hard and I can say them. 2. But I like the Spanish lessons because its fun. 3. I couldn't hardly hear the recorder proution (portion)."
APPENDIX III

STUDENT ACHIEVEMENT TESTS
LISTENING-COMPREHENSION TEST

Sample: A. Buenos días, señor.
*B. Buenos días, señora.
C. Buenos días, Miguel.

1. A. Son las seis.
B. Es la una.
*C. Son las siete.
(Pause)

2. A. El tren sale
*B. El autobús llega
C. El autobús sale.
(Pause)

3. *A. Es jamón
B. Es pan
C. Es helado de chocolate.
(Pause)

4. A. Se llama Miguelito
*B. Se llama el señor alto
C. Se llama la señora gorda
(Pause)

*Correct Answer

5. A. Miguelito es delgado
B. Miguelito es bajo
*C. Miguelito es fuerte
(Pause)

6. *A. cuatro
B. cuarto
C. catorce
(Pause)

7. *A. Pásame la pimienta.
B. Pásame el azúcar.
C. Pásame el pescado.
(Pause)

8. A. Deseo la crema.

*Correct Answer
LISTENING COMPREHENSION

SAMPLE:

You will hear three sentences in Spanish. Choose the one which best goes with the picture and circle A, B, or C depending upon which you think is the right answer. Wait until all sentences are read before you choose.

ANSWERS:

1. A B C
2. A B C
3. A B C
4. A B C
5. A B C
6. A B C
7. A B C
8. A B C
SPEAKING TEST

Buenos días. This is to help me see how well you speak Spanish. Please tell me your name in Spanish. (Pause)

Please repeat these words after me exactly as I say them:

1. todos duermen
2. Pásame el té.
3. por favor
4. la sal
5. señor alto
6. lección cinco
7. Yo soy bajo.
8. El tren sale

On the card in front of you are some pictures.

1. Number 1 is a man. Say "hello" to him in Spanish.
2. Look at the clock in Number 2 and tell me what time it is in Spanish. (6)
3. ¿Qué es? (pan)
4. You are at the table and want some of this. (Mantecaquilla) Ask for it in Spanish.
Yo Soy_________

Mimicry:

todos duermen /d/ accept_______ not________
Pasame el té. /a/ accept_______ not________
/t/ accept_______ not________
por favor /r/ accept_______ not________
la sal /l/ accept_______ not________
señor alto /r/ accept_______ not________
lección cinco /o/ accept_______ not________
yo soy bajo /y/ accept_______ not________
/x/ accept_______ not________
el tren sal /tr/ accept_______ not________
deseo arroz /R/ accept_______ not________

Buenos días, Señor Alto
Son las seis.
Es el pan.
Pásame la mantequilla.

5 points less________
5 points less________
5 points less________
APPENDIX IV

STUDENT ATTITUDE INVENTORIES
PRE-EXPERIMENT ATTITUDE INVENTORY

This is to help us plan our study of Mexico. Please circle YES or NO for each question.

1. Mexico is our neighbor to the south? YES NO
2. Mexico and the United States are friends. YES NO
3. I would like to visit Mexico. YES NO
4. I have already been to Mexico. YES NO
5. The people of Mexico speak a language called Spanish. YES NO
6. Spanish is very different from English. YES NO
7. I would like to study Spanish. YES NO
8. I have already studied Spanish. If you answered "YES" please write how you studied Spanish: ________________________.
9. It is easy for pupils in elementary school to learn a foreign language. YES NO
10. Studying a foreign language helps you in English. YES NO
11. Studying a foreign language helps you in other subjects in school. YES NO
12. Pupils in an elementary school should study a foreign language. YES NO
13. Studying a foreign language helps you think better. YES NO
14. Studying a foreign language helps you to feel closer to people from foreign countries. YES NO
15. When a foreign language is studied in an elementary school, everybody should study it. YES NO
<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.</td>
<td>Mexico is very far away.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>If I had a friend in Mexico I could call him on the telephone.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>I have a telephone in my house.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Telephones are good only for talking to friends.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Mexican children are just like we are.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Spanish is a hard language to learn to speak.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>I have a Mexican friend.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>I would like to have a Mexican friend.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
POST-EXPERIMENT ATTITUDE INVENTORY

Name____________________

Please circle YES or NO for each question.

1. I would like to visit Mexico.  YES  NO
2. I would like a Mexican friend.  YES  NO
3. If I had a friend in Mexico, I could call him on the telephone.  YES  NO
4. Mexican children are just like we are.  YES  NO
5. Spanish is very different from English.  YES  NO
6. Spanish is a hard language to learn to speak.  YES  NO
7. I would like to study Spanish.  YES  NO
8. It is easy for pupils in elementary school to learn a foreign language.  YES  NO
9. Studying a foreign language helps you in English.  YES  NO
10. Studying a foreign language helps you in other subjects in school.  YES  NO
11. Pupils in an elementary school should study a foreign language.  YES  NO
12. Studying a foreign language helps you think better.  YES  NO
13. Studying a foreign language helps you to feel closer to people from foreign countries.  YES  NO
14. When a foreign language is studied in an elementary school, everybody should study it.  YES  NO
STUDENT WEEKLY EVALUATION

PLEASE CIRCLE THE BEST ANSWER FOR EACH SENTENCE.

1. I could hear the Spanish teacher:
   VERY WELL    ALL RIGHT    NOT VERY WELL

2. Noise from outside the room bothered me:
   A LOT       A LITTLE BIT    NOT AT ALL

3. The Spanish teacher's voice was:
   TOO LOUD     JUST RIGHT   TOO LOW

4. Noise from the rest of the class bothered me:
   A LOT       A LITTLE    NOT AT ALL

5. There was noise from the telephone speakers (squeals, pops, hum):
   A LOT       A LITTLE    NONE

6. I knew what the Spanish teacher wanted the class to do:
   SOMETIMES    MOST OF THE TIME   ALWAYS    NEVER

7. Please tell anything else, good or bad, that you noticed or liked about last week's Spanish lessons.
APPENDIX V

STRUCTURES AND VOCABULARY PRESENTED
**STRUCTURES AND VOCABULARY PRESENTED**

During the eight weeks of telephone Spanish instruction the following structures and words were taught to the class:

<table>
<thead>
<tr>
<th>Greetings and Farewells</th>
<th>Directions</th>
<th>Adverbials</th>
<th>Adjectives</th>
<th>Miscellaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buenos días</td>
<td>Escuche(n)</td>
<td>gracias</td>
<td>bueno</td>
<td>por</td>
</tr>
<tr>
<td>Buenos tardes</td>
<td>Repeta(n)</td>
<td>si</td>
<td>delgado</td>
<td>y</td>
</tr>
<tr>
<td>Buenos noches</td>
<td>todos</td>
<td>no</td>
<td>fuerte</td>
<td></td>
</tr>
<tr>
<td>adiós</td>
<td>otra vez</td>
<td>aquí</td>
<td>alto</td>
<td></td>
</tr>
<tr>
<td>hasta la vista</td>
<td>está(n) ausentes</td>
<td>allí</td>
<td>bajo</td>
<td></td>
</tr>
<tr>
<td>mañana</td>
<td></td>
<td>muy bien</td>
<td>viejo</td>
<td></td>
</tr>
<tr>
<td>lunes</td>
<td></td>
<td>por favor</td>
<td>mi, su</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>hoy</td>
<td>ese</td>
<td></td>
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<td>un</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>una</td>
<td></td>
</tr>
</tbody>
</table>

**Question Forms**

- ¿Quiere usted ____?
- ¿Qué es?
- ¿Quién es?
- ¿Están listos?
- ¿Dónde estás?
- ¿Quién ha roto ____?

**Verb Forms**

- Deseo
- Pásame
- lee
- yo soy, es, son
- se llama
- voy a, vamos a
- llega a
- sale a
- duermen

**Telling Time**

- Es la
- Son las ____
- ____ y cuarto
- ____ menos cuarto
- ____ y media

**Adjectives**

- bueno
- delgado
- fuerte
- alto
- bajo
- viejo
- mi, su
- ese
- un
- una
Dates

tres de marzo

Nouns

amigo
el señor, la señora,  
   la señorita
papá, mamá
la casa
el tren
el autobús
el omnibus
el lápiz
el papel
la sopa
el hombre
el periódico
la ensalada
el pollo
el jamón
el pescado
las papas fritas
el té
el agua

Numbers

1 to 100

helado de chocolate
   de vainilla
el pan
la sal
la pimienta
la mantequilla
la crema
enero, febrero, marzo, abril,
   mayo, junio, julio
Feliz Navidad
el año
la pandequeta
la noche
el libro
la página
la lección
el nombre
el arroz
la limonada
APPENDIX VI

TELEPHONE COSTS
One-time charges:

- installation of special telephone line $3.50
- installation of telephone jack 5.00
- installation of telelecture unit 35.00

Total: $43.50

Monthly charges:

- rental, telelecture unit $35.00
- rental, hands-off telephone 7.50
- rental, telephone business line 9.25

Total: $51.75
APPENDIX VII

PHOTOGRAPHS
The tele-teacher, Mr. Manuel Pacheco.

The telephone Spanish class, Lincoln School. Mr. Lister and the telelecture unit at the front, one microphone suspended from ceiling at top right.
BIBLIOGRAPHY

Books


**Articles and Periodicals**


**Reports**


**Unpublished Materials**


