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To determine the use of technology in elementary school music instruction, a research project was conducted with 19 third and 24 fifth grade students and 24 college music education students, testing (1) music learning system with behavioral objectives, instructional specifications, and data analysis; and (2) an electronic keyboard instrument, designed for music instruction in a group setting, with individual learner feedback and instruction. The tested instrument, the Conntone Music Learning facility, utilizes headphones, has individual student call buttons, provides sustained keyboard tone and perfect pitch of all tones on all keyboards, and permits a shift to classroom ensemble use for as many as 24 students at a time. Findings of the study included a limited number of significantly positive Spearman rank order correlations for both the third and fifth grade classes, including gain score with posttest and pretest with posttest scores. Project results included entrance into the school's instrumental music program by the majority of children participating in the project and the initiation at San Francisco State College of a teacher training program in keyboard and music fundamentals, utilizing the electronic music learning system. Descriptions of the learning system and the demonstration film are appended. (JK)

OFFICE OF HEALTH, EDUCATION AND WELFARE, U. S. GOVERNMENT

BUREAU OF RESEARCH PROJECT 8-I-078

REPORT ON FEDERAL PROJECT #1309
FREDERIC BURK FOUNDATION FOR EDUCATION
SAN FRANCISCO STATE COLLEGE

INTEGRATION OF THE SYSTEMS APPROACH AND ELECTRONIC TECHNOLOGY IN LEARNING AND TEACHING MUSIC

Alice M. Knuth
Project Director

REPORT ON RESEARCH AND RELATED ACTIVITIES SUBMITTED TO THE U. S. COMMISSIONER OF EDUCATION FOR SUPPORT THROUGH AUTHORIZATION OF THE BUREAU OF RESEARCH

Title:	INTEGRATION OF THE SYSTEMS APPROACH AND ELECTRONIC TECHNOLOGY IN LEARNING AND TEACHING MUSIC
Contracting Agency:	San Francisco State College
Initiator:	Dr. Alice M. Knuth Professor of Music and Creative Arts San Francisco State College
Transmitted by:	Dr. Shepard A. Insel Director of Faculty Research San Francisco State College 1600 Holloway Avenue San Francisco, California 94132 Area Code: 415 Tel: 469-1863
Contracting Officer:	Mr. Lawrence Eisenberg, Director Frederic Burk Foundation for Education (For and on behalf of San Francisco State College) 75 Southgate Avenue Daly City, California Area Code: 415 Tel: 469-2151
Federal Funds Requested:	$ 9,136.00
Approved:	February 12, 1968
Date Funded:	May 1, 1968

Personnel

Project Director - Alice M. Knuth, Ed. D. (Music Education, University of Oregon, 1958) Present position: Professor of Music and Creative Arts, San Francisco State College.

Instructor of college class and fifth grade elementary school class - Alice M. Knuth (above).

Instructor of third grade elementary school class - Mrs. Marcelle Vernazza, Associate Professor of Music in charge of Basic Class Piano, San Francisco State College.

Consultants - Dr. Jack Crawford, Teacher Research Division, Oregon State System of Higher Education.

Dr. Dale Hamreus, Teacher Research Division, Oregon State System of Higher Education.

Teacher Assistants in charge of supervised practice will be graduate students chosen from the college class, Music Education 151, Curriculum and Instruction in the Elementary School in Music, San Francisco State College.

Facilities

Two Conntone Music Learning facilities, one with a three-octave keyboard, valued at $5,500, the other with a keyboard of 44 keys, valued at $9,200 were housed in a classroom of the Federic Burk Elementary School, reserved by the principal, Dr. Leonard Meshover, for use of the project for the school year, 1967-68. Instruction took place in Room 25 of the Frederic Burk Elementary School.

The use of the Conntone facilities was contributed on loan by the C. G. Conn Corporation, Elkhart, Indiana.

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Introduction

One major concern of music educators in California is that mandated curricula in the public schools have been crowding out the music program. Various reasons given for music being restricted from the school curriculum are that it is too costly, too time consuming, and that it is not significant as it is now taught. The music programs in our teacher training institutions and in our elementary schools show that:

1. Elementary education students' lack of training is due to:
   a. Limited course hours and present methods which do not prepare students to sing and play instruments with confidence, nor to know the elements of music adequately enought to teach them to children.

2. Music education programs fail to:
   a. Allay the personal fears that build up within student teachers, causing them to avoid teaching music when they become regular classroom teachers.
   b. Make use of modern technology and learning research.

The investigator wished to improve the music program in the elementary schools. She believed two things were necessary to do this:

1. The new teacher must be adequately trained in music education.

2. Music educators must make use of modern technology
   a. new learning theories
   b. new facilities and equipment

More than this, the project director had participated in the recent and ongoing Symposium Project, sponsored by the Music Educators National Conference, which had dedicated itself ". . . to explore possible ways and means by which we may be more effective, seek new dimensions for our profession." [1]

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[1] Dr. Robert Choate, "Music in the Emerging American Society," Music Educators Journal, April, 1967, Vol. 53, No. 8, p. 45.

In considering the impact of technology, the project is concerned with how technology can be utilized to bring music to a wider audience.[1] Suggested solutions to the present music problem in our schools, the project director believed, could very well be:

1. A new music learning system complete with predesigned behavioral objectives, objective analysis, instructional specifications, measurement, and analysis of data.

2. The use of an effective instrument of modern technology that is efficient and helpful to the learning of music.

This study was concerned with the solution of these problems. The investigator believed that effort was needed:

1. In the college music education classes where future teachers are trained to teach music to children.

2. In the elementary school classroom to find new and efficient ways to bring about musical growth in children.

The kind of effort needed was that which would insure the students' musical understanding of what music actually is and would offer unique and efficient means for every student in the classroom to perform music at his own level of ability and rate of speed. The investigator believed that it was possible to develop a music learning system with the help of modern technology that would give children or college students opportunity to learn and perform music in the classroom, individually, and in a group situation, with direct communication with the teacher that could be individual or as a group. Much class time could be saved through this

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[1] Ibid., p. 50

type of communication, help could be given when and where it was needed, and students could perform at their own rate of speed and level of ability.

The investigator planned a study integrating a systems approach and electronic technology in learning and teaching music. She submitted the proposal to the U. S. Department of Health, Education, and Welfare, and was given a federal grant to carry on the study at San Francisco State College and the campus demonstration school, Frederic Burk Elementary School. The project made use of the Conntone Music Learning facility, a portable music laboratory recently developed by the C. G. Conn Corporation, leading manufacturers of band and orchestral instruments, pianos, and organs. Dr. William Knuth, working cooperatively with the engineers of the Conn Corporation during the last five years, helped to develop the present Conntone Music Learning facility with the following essential and basic features:

1. A two-way communications system by means of headphones and red light call buttons for immediate communication to help individual students with musical problems.

2. Opportunity for everyone in the class to use headphones for private study and practice on his own level without sound being audible to anyone else except the teacher.

3. Flexibility for immediate shift to classroom ensemble after individual problems are solved, permitting the continuum of group performance in singing and playing.

4. A sustained keyboard tone for every student station with accurate intonation assured by the facility at every station.

5. Flexibility of programing and individual feedback at any or every student station.

6. Facility operation is simple, flexible, effective, and reliable in all classroom learning situations.

The investigator believed that the Conntone Music Learning facility was innovative in motivating music learning because it:

1. Allowed the instructor immediate two-way communication with individuals or the entire class.

2. Maintained perfect pitch of all tones on all keyboards.

3. Allowed immediate feedback from student to teacher.

4. Accommodated as many as 24 students at a time.

5. Could be used without headphones as independent ensemble instruments sounding in any of four different tone colors.

Field Tests Using the Conntone Music Learning Facility

Two field tests, one for elementary school children and one for college students, already had been made with the Conntone Music Learning Center. A Conn prototype complete with 24 keyboard stations was used for the first time in a pilot session conducted by the investigator, at Oregon College of Education. Two summer music centers for children were held from June 21-30, 1967, and July 5-14, 1967. Their purpose was to give children, ages seven through twelve, a learning experience in music through singing, playing keyboard and classroom instruments, moving rhythmically, and dramatizing songs, poems and stories. No previous music training was required. The sessions were held in the Campus Elementary School each day from 9:30-11:30 o'clock. Emphasis was upon learning music through playing the recorder and at the keyboard

and through singing. The rather intensive learning extended from beginning rote experiences to reading melodies and simple harmonies. Each child had his own recorder and a Conn keyboard station. Children who had had no music training at the keyboard were able during the two eight-day sessions to play simple melodies and simple harmonies at the keyboard. Their interest and enjoyment of the Conn keyboard facility was shown by their coming voluntarily an hour early to practice on the instrument before class instruction began. Many children continued their summer training by enrolling in fall music classes at school and by taking private instruction on the piano.

The field test for college students was carried on during the Fall semester, 1967, at San Francisco State College with two sections of the Music Ed. 100 class in music fundamentals. The students had a portion of their class instruction devoted to keyboard experiences using the individual Conn student stations. All students learned to play simple melodies and harmonies at the keyboard, though many had had no previous keyboard experience. The opportunity for each student to have a keyboard to work on, and the two-way communication opportunity with the teacher on a flexible one-to-one as well as a group basis made individual learning progress at a rapid and more meaningful rate.

The investigator believed that this same type of study should be a vital part of the music education program in teacher training. (For a detailed description of the Conntone Music Learning facility, see Appendix A.)

The Conn Corporation had provided the investigator complete use of two Conntone instruments for research purposes for the school year, 1967-68, at San Francisco State College.

On November 27, 1967, the investigator and another professor on the music education faculty at San Francisco State College started teaching music to children at the Frederic Burk Elementary School. The proposal for the project had been submitted to the federal government, but whether or not a federal grant for the project would be given, the two college professors had agreed to carry on the study continuing throughout the rest of the school year, until June, 1968. The investigator taught a fifth grade class of children and the other professor taught a third grade class. The investigator planned also to use the instructional system and Conn facility with a college music fundamentals class during the Spring semester, 1968. In December, 1967, the federal grant, #1309, was approved for the study to take place, Spring semester, 1968.

OBJECTIVES

The project had two objectives:

1. To develop an improved instructional system for college music education classes.

2. To develop an improved instructional system for elementary school general music classes.

Through the realization of these two objectives, the investigator attempted to test the following hypothesis:

Through being taught by means of an instructional system making use of new learning principles [1] and modern electronic technology [2] the college elementary education major in the music education class, and the elementary school child will learn music more quickly, more effectively, and with more enjoyment than by any other known means.

Specific objectives of the project were for the college elementary education student and the elementary school child to:

1. Sing and play the recorder, (a simple, easy-to-play wind instrument similar to the flute) and a keyboard instrument (e.g., the piano keyboard) with skill and enjoyment.

2. Understand the fundamental elements of music (rhythm, melody, harmony, form) through the activities of singing, playing and listening.

3. Read musical notation.

DESIGN

The study involved two groups, a college music education class of twenty-four elementary education majors and elementary school classes of a third grade class of twenty children, and a fifth grade class of

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[1] The concern of this study was to develop more effective and efficient instructional materials, tests, procedures, and system for learning music in the college music education classroom and in the elementary classroom.

[2] Two-way communication between student and teacher was possible by means of individual keyboard stations, electronically controlled. This system provided opportunity for a student to practice individually, immediately after he had been introduced to a musical concept, with the teacher, not the class, hearing him and guiding him. "Silent" practice, audible only to the individual student through the use of the headphones, changed instantly to audible classroom ensemble playing.

twenty-six Children. All groups worked through an instructional system appropriate to their level. The period of study under the federal grant, was for one semester each for the college class and the elementary school classes, devoted to gaining concepts of the elements of music (rhythm, melody, harmony, form) and to acquire skills in performance at the keyboard, on the recorder and in singing. Performance of individuals, small groups, and the entire class was observed frequently by the instructor. The standardized Snyder Knuth Music Achievement Test [1] was administered to the college class at the end of the semester to measure achievement in music reading and music concepts. The standardized Knuth Achievement Test in Music, [2] Form A, Division 1, was administered to the elementary school classes at the beginning and at the end of the Spring semester to measure perception of melody and rhythm in the context of a four-measure phrase. A performance test was administered to individuals of the elementary school classes to measure ability to sing, to play the keyboard instrument and recorder, and to sight-read music.

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[1] The Snyder Knuth Music Achievement Test is published by Creative Arts Research Associates, P. O. Box 117, Monmouth, Oregon, 97361. It has been used each semester at San Francisco State College in the screening and placing of college students into music education classes. If students pass the test, they may waive the required music fundamentals course.

[2] The Knuth Achievement Tests in Music, published as a test battery in 1936, by Educational Test Bureau, Minneapolis, Minnesota, were widely used in the public schools and teacher training institutions for more than two decades. A recent revised edition of these tests using filmstrips and pre-recorded tapes resulted from much inquiry and demand in the current interest in music learning evaluation. The percentile norms were computed from over 10, 000 tests administered in eleven different school systems representing various geographical areas of the nation. These tests are useful today in evaluating music learning through the recognition of rhythmic and melodic concepts in grades 3-12. Revised edition published by Creative Arts Research Associates, P. O. Box 117, Monmouth, Oregon , 97361.

Although the study was concerned primarily with the development of an improved learning system, supplementary data involved measuring the achievement of another section of the college music education class, Music Ed. 100, and another third grade class and fifth grade class in Frederic Burk School, neither of the classes having used the Conn facility during the course of the semester. The same standardized tests described above were given to each respective class as a pretest so that basic conceptual comparisons of melodic and rhythmic music achievement could be made at the beginning of the study, and as a post test to measure each individual's development.

Behavioral Objectives

College class, Music Education 100:

Performance

Conn keyboard:	Play the melody of simple songs from text with right hand in treble or left hand in bass.
Recorder:	Play all tones with correct fingering chromatically from middle C to A, first leger line above treble staff.
	Play simple melodies with proper rhythm, tempo, accurate fingering, good tone.
Singing:	Produce tone freely with proper breath support; transfer pitch control, breath control, and good tone production from recorder playing to singing.
	Sing a melody or harmony part independently.
Sight reading:	Sight read simple melodies through singing and playing, using proper pitch and rhythm.
Aural perception:	Recognize basic chords, scale patterns, and intervals in melodic and rhythmic context, major and minor.
Aesthetic discrimination:	Attend student recitals at San Francisco State College and listen to skilled performance of music majors singing and playing piano, recorder, and various band and orchestral instruments.
	Attend two formal concerts presented by San Francisco State College Music Department.
Aural and Cognitive perception:	Recognize basic rhythm, melody, harmony, form and timbre.

Behavioral Objectives for a 3rd and 5th Grade Class

Musical Concepts:	Become acquainted with the basic elements of music (rhythm, melody, harmony, form, tone color) as they appear in the music the children sing, play, and listen to.
Performance:	Locate tones on the keyboard and recorder and play with proper hand position and fingering.
	Play simple melodies, rhythms, and harmony parts on the keyboard and recorder.
Singing:	Produce tone freely with proper breath support; transfer pitch control, breath control, and good tone production from recorder playing to singing.
	Sing a melody independently and with a group.
Sight reading:	Read the basic symbols and terms of music notation and know their meanings (e. g., staff, key signature, meter signature, notes, rests, sharps, flats, scale, interval, leger line, cadence, repeat sign).
	Read portions of a simple folk song type melody.
Aural perception:	Recognize by ear short melodic and rhythmic patterns, tonal intervals of the unison, octave, third, fifth, second.
Improvisation:	Make up short melodies, original rhythmic patterns, an ostinato, and simple rhythmic or tonal accompaniments to a song.

Procedure

The college music education class met twice a week for two hours. Each class meeting involved predesigned step-by-step instruction in singing and on either the Conn keyboard or the recorder. When the class met in the classroom #25 at the Frederic Burk School, each student had a keyboard instrument (a Conn student station). Basic instruction to play both instruments and to sing were given by the instructor. About half the class meetings were held in the music education classroom in the Creative Arts Building on the San Francisco State College campus, and half were held in Room 25 at the Frederic Burk School. The students began the semester's work by performing through (1) rote singing and playing (for the purpose of producing good tone and gaining facility in proper fingering, hand position, and correct breathing), then proceeded to (2) reading simple music notation on the staff, (3) to improvising and writing simple melodies, (4) to reading, singing, and playing simple harmonies to accompany a melody. Listening assignments as outlined in the text, Basic Resources for Learning Music,[1] to illustrate musical concepts were prepared by students outside of class time.

The original plan was that each student would be required to put in one hour of supervised practice on the Conn instrument in the Frederic Burk School classroom, #25, which housed the Conn facility, with a teacher assistant giving group and individual help as needed during the supervised practice

[1] Alice M. Knuth and William E. Knuth, Basic Resources for Learning Music, Belmont, California, Wadsworth Publishing Co., Inc., 1966.

hours. Due to the delay in funding the project, it was impossible to use student assistants to supervise the keyboard practice of college students in the Frederic Burk School classroom. [1]

Assignments in the text for self-study by the college students were read and performed by students prior to each class meeting. Pre-practice and post practice of text assignments were handled by the instructor during class sessions as needed. Observation of individual and group performance in playing and singing were carried on by the instructor at each class session.

The elementary school third grade class and fifth grade class separately met twice a week for forty minutes. No formal text was used. Study sheets and practice sheets were prepared by the instructor for home study and use during class time. Basic instruction in singing and playing the keyboard instrument and recorder were similar to that given the college class but suited to the elementary level. There were no supervised practice periods scheduled. The children carried on voluntary practice at home on the recorder, singing, and piano when available. Performance during class time was observed by the instructor, as in the college class.

The third grade class came to Room #25 twice a week for instruction: Monday and Wednesday mornings from 9 o'clock until 9:40. Mrs. Marcelle Vernazza was the teacher for their music instruction. There were 24 Conn

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[1] In a letter dated April 27, 1968, Mr. John P. L. Thorsley, of the regional office at San Francisco of the Department of Health, Education, and Welfare, notified Mr. Lawrence Eisenberg, Foundation Director of the Frederic Burk Foundation for Education: "The period of support covered by this grant will be May 1, 1968 through September 30, 1968. The grant will be subject to Office of Education Grant Terms and Conditions dated 2/12/68."

student keyboard stations in the room, and 20 children in the third grade class. Each child had a keyboard to use. The classroom teacher usually sat at one of the keyboards and performed and learned along with the children. The three remaining keyboards were used by three fifth grade girls who came to the third grade music class for instruction. The fifth grade had an enrollment of 26 children, and with only 24 keyboards, some children would have been without keyboards to use had they not attended the third grade class sessions.

The fifth grade class also came to Room #25 twice a week for their music instruction: Monday and Wednesday mornings from 10 o'clock to 10:40. The classroom teacher always came with the children, and, like the third grade classroom teacher, stayed for the music time. The fifth grade class was taught by Dr. Alice M. Knuth. The intense interest and wholehearted cooperation of these two classroom teachers stimulated the children to learn music and to give their attention and best efforts during the class periods.

The two music teachers met regularly once a week to plan the materials to be used and the procedures for instruction for each week's work, and to evaluate the learning taking place.

The investigator attended each third grade class session taught by Mrs. Vernazza, and kept notes on what was done each day. Each teacher prepared a lesson plan for each lesson and shared this with the other teacher. It soon was apparent that, though both classes started at the same place in instruction, beginning with very basic keyboard instruction, the third grade class would move more slowly because of less maturation than the fifth grade children.

Seating charts were used for each class. Each child had his own keyboard station which he used for each session. The children also wore name-tags, which helped the music teachers to communicate to them individually as well as in groups.

Two girls, college students from Dr. Knuth's music methods class for music majors, volunteered to assist in the project. One girl came each day to the third grade class to help Mrs. Vernazza, and the other girl came each day to the fifth grade class to help Dr. Knuth. These students assisted individual children with their hand positions and fingering on the instruments, with following instructions and keeping their place in following the music notation, and occasionally in helping a few children individually to produce tones on the recorder.

Instruction on the recorder was not begun until the children had had approximately six weeks of singing and keyboard instruction. The first day the recorders were introduced, the children were given instruction that was related only to the recorder. They learned how to hold the instrument, how to blow, how to finger to produce three different tones, and to play a simple three-tone melody. During succeeding lessons, singing, recorder playing, and keyboard performance were taught in each forty minute period.

Ear training was a part of every lesson. Matching tones by singing the pitches played on the keyboard, singing letter names of notes shown on the chalkboard or flash cards, and singing back with syllable or letter names, or playing back groups of three tones played by the teacher at the keyboard were frequent activities.

Rhythm exercises involved clapping rhythm patterns from songs that were being learned, clapping rhythm duets and rounds from musical notation on charts, and adding movements to illustrate duration of tones of songs sung by the class.

In each lesson there was opportunity for individual and group participation. Through the use of earphones each child could practice privately at his keyboard station the songs currently being learned by the class. Any child who wished, could play individually for the class. Later in the lesson, with his earphones removed and the speaker button switched on at his keyboard station, he could play in small groups, portions of the songs (e.g., each of the four groups of six playing a phrase of a song), or he could play an entire song in ensemble with the class. For variety in performance, the teacher often would divide the class and have the children participate simultaneously in any of the following ways:

one half of the class	the other half of the class
a. sing the song	a. play the recorder
b. play the recorder	b. sing the song
c. sing the song	c. play the keyboard
d. play the keyboard	d. sing the song
e. play the recorder	e. play the keyboard
f. play the keyboard	f. play the recorder

Singing was always stressed in every lesson. The children in both grades improved in their ability to sing with musical, well produced tones

and to sing in tune. With added skill in singing their enjoyment of it increased.

In nearly every lesson the children were given opportunity to improvise at the keyboard. This was carried on with each child using his own earphones and switching the headset button on, so that he but not the class could hear his playing. Improvisations included making up tunes using a given number of tones, making up a song using scalewise tones, making up songs using tones of the tonic chord, and making up a two-part song having a "dialog" between the left hand and right hand at the keyboard. When a child was ready with an improvisation and wished to play it for the class, he was given opportunity to do so.

Space does not permit showing the details of the specific lessons taught. Representative lessons were given from the third and fifth grade levels of the widely adopted basic elementary school music text series, "Growing with Music," Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

Working With the Consultant

On January 30, 1968, the investigator and her husband Dr. William E. Knuth, visited Dr. Jack Crawford, Teaching Research Division, at the Oregon College of Education campus. A two-hour conference covered discussion and plans for these areas of the study:

(1) Giving a pre-test and post-test to the third grade class and the fifth grade class.

(2) Preparing a script for the film showing the concepts and skills.

(3) Preparing of the children in the third and fifth grade classes charts and other visuals for instruction.

(4) Keeping a teacher's log of what worked well in each lesson, what was tried, and how the children did.

(5) Making a tape to record individual and group performance in class lessons.

(6) Building an evaluation measure to use at the end of the semester to determine each child's attitude and enthusiasm for the learning achieved during the study.

Changes in the Original Plan

The delay in not funding the project until May, 1968, deleted, as has been mentioned, the use of student assistants for the supervised practice of the college students on the Conn keyboards. This meant, also, deleting the scheduling of practice hours outside of class. Without the necessary funds, all assistance in graphics was cancelled. Charts and visuals used for the class lessons were prepared by the two music teachers, Mrs. Vernazza and Dr. Knuth.

The only available classroom at Frederic Burk School, Room #25, was assigned for this project. The master console and the twenty-four keyboards were housed here and set up for student use.

MAKING THE FILM

A part of this study was to include the making of a film to show the children through sight and sound in a class situation learning music with the help of modern technology, in this case, the Conn facility.

Plans for the film were discussed on January 30, 1968, with the consultant,

Dr. Jack Crawford, of the Teaching Research Division, on the Oregon College of Education campus. He advised us to plan carefully ahead of time for the film deciding what we wanted to show and demonstrate. He suggested that we write a 15-minute scenario or script that would be focused on the children learning music, and at the same time illustrating the power of the learning facility and system.

In February, 1968, the investigator wrote a rough draft of the film script. The music teacher of the third grade, Mrs. Vernazza, and the investigator agreed that they wished to show in the film the sequence of music learning from the beginning of the study to the last weeks of the project. This would give the viewer a more complete picture than if an attempt were made to show in the film a single third grade and fifth grade music lesson.

From the standpoint of instruction and music learning, there was no difficulty in writing the script.

On March 10, 1968, Dr. George Steiner, Head of the Educational Television area at San Francisco State College confered with the investigator and her husband for script planning. Dr. Steiner was most helpful in giving necessary information to plan a successful script. He advised:

(1) writing the narration in detail, leaving nothing to impromptu speaking.

(2) starting the story from the beginning and use one basic studio setting.

(3) using as many different scenes as necessary, but dissolving from one scene to another with no abrupt changes.

(4) on the written page, including one column for audio, and one for visual pickup.

(5) alternating closeups of individual children and parts of the Conn facility with group pictures of the class at work.

His main advice was to tell the story, demonstrating children participating in the systems approach and at the same time demonstrating the uniqueness of the Conn facility.

During the conference, we decided that there should be two narrators: the investigator would narrate, as needed, when Mrs. Vernazza was teaching the third grade class, and Mrs. Vernazza would narrate when the investigator was teaching the fifth grade class. Dr. William Knuth was to appear in the beginning of the film to explain the Conn facility, and to introduce the children at work.

With these helpful suggestions from Dr. Steiner, the investigator discussed the script with Mrs. Vernazza. They agreed to show in the film the third grade class learning music, followed by the fifth grade class in a similar situation. Only one setting was needed. Mrs. Vernazza agreed to revise the portion of the original script pertaining to the third grade, and the investigator would do the same with the fifth grade portion. A copy of the revised script eventually was sent to Dr. Jack Crawford, the Consultant. This copy was the result of two re-writes from the original first draft. On May 3, Mrs. Vernazza, Dr. William Knuth, and the investigator met with the film director, Dr. Peter Dart, professor of film in the Radio Television Department at San Francisco State College. He had been given a copy of the film script previously so that final plans and details for the filming could now be discussed.

During the conference with Dr. Dart, the film director, the participants -- Dr. Alice Knuth, the project director, Mrs. Vernazza, and Dr. William Knuth, all agreed that the emphasis in the film should be on the children, using the Conn Music Learning System. The credit lines, visuals, and set design were put into final form. It was decided that when Mrs. Vernazza was shown teaching the third grade class in the film, the project director would be the narrator. When the film showed the project director teaching the fifth grade class, Mrs. Vernazza would be the narrator. This way no third party unfamiliar with the children need be involved. The script was reviewed and minor changes were agreed upon. Dr. Dart advised that during the actual filming, the script be adhered to rather closely. The place for the filming, Studio I, in the Creative Arts Building, was chosen, rather than filming in the Frederic Burk classroom. Some class environment, such as instructional charts and children's art work, would be brought into the studio.

From May 4-10, the film script was revised and rewritten. On May 15, the children came to the Studio I, and the project was filmed as planned. A showing of the film was given for the children of the third and fifth grade classes at the Creative Arts Building two weeks later. For a description of the film, see Appendix B-44. The completed film ran 23-1/2 minutes.

Another showing of the film was given for the dean and associate dean of the School of Creative Arts, the principal of the Frederic Burk School, the project director, Dr. Jack Crawford, the project consultant, Mrs. Vernazza, Dr. William Knuth, a representative from the Frederic Burk Foundation, and

the western manager of the Conn Corporation. In the discussion which followed, Dr. Peter Dart, the film director, expressed his pleasure in the completed film, saying that he believed we were successful in showing what the children had learned in music through the Conn Music Learning System. All those present at the viewing reacted very favorably to the film. Dr. Crawford said no revision or editing of the film was advisable, that it should be left just as it was, and that the story was told well. In the Fall of 1968, the film was shown at various conference meetings of music educators in Oregon. Those who saw the film showed much interest in it and in the approach to music learning used in the project. The film will continue to be shown to music educators throughout the country.

SHARING THE PROJECT WITH PARENTS

An Open House was scheduled for one evening at the Frederic Burk School to give opportunity to the parents of all the children to visit classrooms and observe their work. Room 25, which housed the Conn Music Learning facility, was open to the parents. Many came to observe their third grade children and fifth grade children play at the keyboards and demonstrate their ability to improvise and to play the pieces they had learned. The parents enjoyed trying out the keyboards and playing both with and without the use of the headsets.

Questionnaires to Parents

On June 4, a questionnaire was sent to the parents of each child participating in the project in an effort to determine 1) whether the music program

had been worthwhile for the child and 2) what his attitude toward the program was. A copy of the questionnaire is shown in Appendix E-60.

Of 19 questionnaires sent to parents of the third grade children, 19 were returned. Eleven rated the progress of their child in the music program as very high or high; seven rated the child's progress as medium; one could not determine the child's progress. Fourteen rated the child's interest in the music program as very high or high; three as medium, and two as low. On giving evidence of the child's use of his music skills during recreation or leisure time, ten parents said the child participated in the music activity of playing or singing every day; nine said once or twice a week. In noticing how the child did what skills he had developed, twelve parents said the child showed much improvement; six said some improvement; and one said she could not judge.

In response to 25 questionnaires sent to parents of the fifth grade class, 15 were returned. Nine rated the progress of the child in the music program as very high or high; six as medium. Ten rated the child's interest in the music program as very high or high; five as medium. (It is interesting to note that all those children rated with very high or a high interest in the program also rated very high or high in progress.) Regarding evidence of using his skills in recreation or leisure time, eleven children were indicated as performing every day; four children as once or twice a week. Noting how the child did and what skills he had developed, ten parents said the child showed much improvement; five said the child showed some improvement. Many parents wrote personal notes on the questionnaire thanking the teachers for the program. One indicated that

the child had developed an interest in singing, another that the child had asked to take piano lessons as a result of the program, and another that the child now knows his notes and can play "a great variety of songs which he and his family have enjoyed."

SAMPLING AND MEASUREMENTS

There were no formal sampling groups. The college class was one of three sections of Music Education 100, a course in music fundamentals and resources for the classroom teacher. The elementary school classes were one of two 3rd and 5th grade classes in the Frederic Burk Campus Elementary School. Both groups were homogeneous, made up of individuals with various backgrounds. A large portion of each class had no formal music training. It was not important to know the extent of former music training for each individual. Though no pretest was mandatory for this pilot study, the investigator administered a pretest to the two elementary school classes, the two third grades and the two fifth grades, for the purpose of determining whether the system worked differently with the trained, the apt, or the clumsy. This study was concerned mainly with new learning principles and the use of modern technology. The investigator wanted to determine to what degree the Conntone facility relates to music learning, and the extent of its practicality in a normal college classroom and in a normal elementary school classroom.

Musical concepts and ability to sight read music were measured by means of the Snyder Knuth Music Achievement Test, a standardized test. This test was administered to the treatment college class at the end of the semester,

and to one of the other conventional sections of Music 100.

Performance in the 3rd and 5th grade classes was observed and evaluated by the instructor every week, giving opportunity to each child to play individually as well as in groups. An evaluation of performance was made of each student's playing the recorder and at the keyboard, singing, and listening. Perception of melody and rhythm were measured by a pretest, the standardized Knuth Achievement Test in Music, Division 1, Form A, which was administered at the beginning of the project to the treatment third and fifth grade classes and the conventional third and fifth grade classes. A post test, the Knuth Achievement Test in Music, Form B, Division 1, was administered at the end of the semester to the two third grade and fifth grade classes mentioned above.

The Pretest and Post Test

The Knuth Achievement Test in Music, Form A, Division 1, was administered early in the project to the treatment third grade class, the conventional third grade class, the treatment fifth grade class, and the conventional fifth grade class. At the end of the project, the Knuth Achievement Test in Music, Form B, Division 1, was administered to both third grade and fifth grade classes mentioned above. Table 1 below shows the results for the treatment third grade class and conventional third grade class. Table 2 below shows the results for the treatment fifth grade class and the conventional fifth grade class. The raw scores earned by the children for the pre-test and post-test appear in Appendix C-48 .

ANALYSIS OF PRE-TEST AND POST-TEST SCORES FOR TWO 3RD GRADE CLASSES
on
Knuth Music Achievement Tests Division 1
3rd Grade, Frederic Burk School, San Francisco State College

		Pre-test, Form A Score	Post-test, Form B Score	Gain Score
Teacher A Instruction	N	19	19	19
	Mean	6.32	11.74	5.42
	S.D.	5.41	9.13	7.52
Teacher B Control	N	21	21	21
	Mean	4.48	7.10	2.57
	S.D.	5.71	6.15	4.35
Both Classes	T score	1.05	1.87	1.45
	d.f.	38	38	38

ANALYSIS OF PRE-TEST AND POST-TEST SCORES FOR TWO 5TH GRADE CLASSES
on
Knuth Music Achievement Tests, Division 1
5th Grade, Frederic Burk School, San Francisco State College

		Pre-test, Form A Score	Post-test, Form B Score	Gain Score
Teacher A Instruction	N	24	24	24
	Mean	14.81	20.08	5.27
	S.D.	9.89	11.50	7.34
Teacher B Control	N	24	24	24
	Mean	18.17	23.04	4.87
	S.D.	10.69	10.91	6.12
Both Classes	T score	-1.15	-0.94	0.21
	d.f.	48	48	48

The results of the measurement for the groups are similar to the way in which they were predicted. The reason for the scores falling as they did is due to the high variability of individual pupils. For example, in the third grade treatment class, one child progressed in a superior way as far as performance and class participation were concerned. His parents being Japanese, and his language difficulty may have been the reason for his poor performance in the achievement tests. One third grade child made a score gain of 16 points from the Form A test to the Form B test; another made a gain of 15 points, and another a gain of 12 points; one child earned a score gain of -11. One child in the fifth grade treatment class made a score gain of 26 points in the Form A and Form B scores; another a gain of 15 points, another a gain of 13 points, and three others a gain of 12 points. One fifth grade child made a score gain of -8. The high variability among individual students offset the group scores.

A Teacher-made Test

Halfway through the project, a teacher-made test was administered to the treatment fifth grade class and to the conventional fifth grade class. The test consisted of the investigator's teaching a new song, "Hey Ho! Nobody Home," to the children and their responding visually and aurally to test items related to the song. A table is given below showing the test results of the two fifth grade classes. The investigator had planned to teach this song as new and unfamiliar to the children. Those in the conventional class were already quite familiar with the song. To most of the children in the treatment class, however, the song was new and unfamiliar. There was no appreciable difference between

the two classes, as shown by the T-test score in Table 3, below. A copy of this teacher-made test and the individual raw scores appear in Appendix D-54.

Table 3

Grade 5, Teacher-Made Achievement Test, Perfect Score = 84

Teacher A Treatment Class	N =	26
	Mean =	57.96
	S.D. =	15.43
Teacher B Conventional Class	N =	25
	Mean =	65.48
	S.D. =	15.70
	T Score =	-1.72
	P	0.10

The Performance Tests

Toward the end of the project, individual performance tests were given to each child in the treatment third grade class and in the treatment fifth grade class. The tests consisted of 1) performance at the keyboard, 2) playing the recorder, and 3) singing. The children performed in each of these three media, using songs they had learned during the project. Each child's performance was recorded on tape and judged by three music specialists. Each judge listened individually to the tapes and recorded his rating of each child's performance in the three categories of keyboard playing, recorder playing, and singing. The performance tests helped the music specialist teachers of the third grade class (Mrs. Vernazza) and of the fifth grade class (the investigator) to determine the progress and ability of each individual child in the

field of performance. Below are given the ratings of the three judges for each child.

Attitudinal Test

No formal attitudinal test was administered to the children. However, an indication of the interest in music brought about by the project was shown in the unusually large number of children who enrolled in the school instrumental music program, Fall, 1968. Fourteen of the nineteen third grade treatment class children enrolled, and ten of the twenty-six fifth grade treatment class children enrolled in the school instrumental music program, September, 1968.

Post-test, College Students

At the end of the project, a post test was administered to the treatment Music 100 college class and the conventional Music 100 college class. The Snyder Knuth Music Achievement Test, Form A, was used. Results of this post test are given below in Table 4.

RESULTS

In analyzing the results of the measurements administered, six areas were correlated for the third grade treatment class and six areas for the fifth grade treatment class. The areas were: 1) the gain score between the pretest and the post-test, 2) the pretest, 3) the post-test, 4) the keyboard performance, 5) the recorder performance, and 5) singing. A correlation was done for every possible pair of the six sets of measurements. The correlations that were run on these were the Spearman rank order correlation, corrected for

ties. The two tables below, Table 4 and Table 5, show the results of the analysis done on the scores using the Spearman rank order correlation.

Areas in rank order and correlation results:

1. Gain score
2. Pretest
3. Post-test
4. Keyboard performance
5. Recorder performance
6. Singing

Grade 3

n = 19

Grade 5

n = 24

n = 19 $p < .05$ $r \pm .462$

$p < .01$ $r \pm .608$

n = 24 $p < .05$ $r \pm .409$

$p < .01$ $r \pm .537$

sig.
+r: $r \pm 0$, therefore subject who scores high on first measurement also scores high on second measurement and vice versa.

sig.
-r: $r \pm 0$, therefore subject who scores high on first measurement tends to score low on second measurement and vice versa.

For the third grade, there was a significant positive correlation between the gain score and the post-test ($p < .01$) and between the pretest and the post-test ($p < .05$). Those children with a high gain score tended to score high on

the post-test. Those who had a high pretest score tended to score high on the post-test. The good ones tended to get better, and the poor ones stayed in approximately the same position. Correlations between other pairs of scores were not significant. The zero correlations tended to indicate that the subjects changed positions between the two tests in no consistent order. Some who tended to score high on the first test may or may not have scored high on the second test. There was no consistency.

TABLE 4

Significant Rank Order Correlations for Third Grade Class

Comparison	Correlation	Probability	N
1-3	.82844477	.01	19
2-3	.54711133	.05	.9

For the fifth grade, there was a significant correlation between the gain score and the post-test ($p < .05$), the pretest and the post-test ($p < .01$), the pretest and keyboard performance ($p < .01$), the pretest and singing ($p < .05$), and the post-test and the keyboard ($p < .01$). All other comparisons are essentially zero correlations.

TABLE 5

Significant Rank Order Correlations for Fifth Grade Class

Comparison	Correlation	Probability	N
1-3	.47135415	.05	24
2-3	.76778707	.01	24
2-4	.60454599	.01	24
2-6	.41168527	.05	24
3-4	.59750840	.01	24

The investigator had looked for a significant positive correlation between the gain score and all of the areas of performance. In the third grade there was zero correlation between the gain score and each area of performance. This may have been due to the high variability among individual students. The classroom teacher, who felt inadequate in teaching her own music, may have been another factor. It is possible that the achievement test in music, both pretest and post-test, may have been a very novel experience for the children. The size of the class may have been a contributing factor. Nineteen children are a fairly small sample for this kind of study. More subjects would probably allow for greater accuracy in prediction. If a study of this kind were to be done again, the investigator would recommend that the class size be at least twenty-four children.

In the fifth grade there was no significant positive correlation between the gain score and the areas of performance. This may have been due to the high variability among individual students. There was considerable motivation on the part of the children to play at the keyboard. This may account to some extent for the significant positive correlation between the post-test and the keyboard performance. This group of children preferred playing at the keyboard to singing, and wished to spend less time on singing than on playing. Their classroom teacher did not participate with the children in singing and felt inadequate to lead them in songs.

Were the investigator to conduct another study similar to this one, she would hope to work with the children three times a week rather than twice.

She taught the fifth grade children Monday and Wednesday of each week, and they had no music on any other days. From Wednesday to the next Monday is a rather long time for the children to have no music instruction. She also would hope to have a music room that was used for music only, rather than a room that was crowded and occupied a great deal of the time for other types of instruction. In this study she was competing with typing classes, which limited the space available for the music area, and placed the children in too cramped quarters at the keyboards. If a music room were not available for the study, the investigator would hope to have available space in the children's classroom for the music instruction.

SCOPE AND SEQUENCE OF THE STUDY

In this project four emphases were stressed:

1) playing at the keyboard
2) singing
3) playing the recorder
4) moving, or physical response to rhythm

Though there was much interest on the part of the children in playing music both at the keyboard and on the recorder, singing was never neglected. Good singing was emphasized and stressed at every lesson. There was some ear training given the children at every lesson, as well as individual and group instruction at the keyboard.

A teacher's log was kept for every lesson throughout the project. Immediately after each lesson, the teachers reviewed their lesson plans and noted those things which seemed to go well in the lesson and those things which did not go well, how the children did, and what was tried. These things were always reviewed before the next lesson was planned in final form. When difficulty arose in a lesson, the trouble was usually centered in the teacher's moving too fast or trying to cover too much material without allowing ample time for the children to gain the necessary skill to move on to the next step. The teachers agreed that thorough understanding of concepts and mastery of skills were imperative if the children were to progress, step by step, through the music program.

Playing at the keyboard required two special skills: learning the keys and relating them to the musical notation. The child needed to learn the lines and spaces of the staff and to read musical notation. He also needed to learn the letter names of each key at the keyboard and know which note on the staff indicated a given key to be played. Constant learning and practice needed to take place to develop these skills. Singing the letter names of notes on the staff, finding the corresponding keys at the keyboard, playing the keys with the proper fingering, and singing the tones as they were played seemed to be most helpful to the children. Opportunity for individual practice, by means of using the earphones, immediately after a new problem was presented to the group seemed to be very helpful to the children. Ear training exercises seemed to go well in both third and fifth grade classes. The children's

interest was high. In the fifth grade class one song was dropped soon after it was presented. The phrases involving a shift in hand position were too difficult for the children to master, and they seemed to be apathetic regarding the song. Movement related to rhythm patterns were of interest to the children. Snapping the beat, brushing hands on eighth notes, tapping toes and swinging arms to indicate accented tones were enjoyable to do and aided children in comprehending the duration of notes they learned to read in musical notation.

The variety of musical experiences -- playing at the keyboard, singing, playing the recorder, and moving to rhythm patterns -- kept the interest of the children. They came to the music lessons eager to participate and were reluctant to leave when the lessons were ended. Many children requested taking their notebooks of song materials home to practice. The children remembered to bring their recorders to each class lesson; very rarely did any child forget, and leave his recorder at home.

In the beginning of the project, the children happened to be seated more or less according to ability. For example, groups A and B had children of high ability in each group, while groups C, D had many children of lesser ability. New seating charts were made more than once during the project, for the purpose of reseating the children so that the strong ones alternated with the weak ones. During some of the individual practice periods, it was possible for the strong ones to help the weak ones. This worked well.

Dividing up activities on some of the more difficult songs seemed to go well. For example, a third of the class would play the first phrase of the song and its repetition at the keyboard; another third of the class would

sing the phrases of the song that were too difficult to play; the other third of the class would play certain phrases of the song on their recorders. Upon performing the song again, the children would be assigned another portion of the song so that all eventually had a chance to play at the keyboard, to sing, and to play the recorder.

Many songs were performed in various ways. In learning a song, the tones were often sung using the letter names. Then the song was sung with words. The song would be sung again with the last two measures played on the keyboard or on the recorder. Eventually, the entire song would be played at the keyboard or on the recorder. Eventually, the entire song would be played at the keyboard and on the recorder. Some songs were approached at the keyboard, the children playing the entire song after singing it. Performing the songs in various ways appealed to the children and kept their interest.

New tones introduced through songs were difficult for the children to play, both at the keyboard and on the recorder. For example, the tone F sharp was re-taught in subsequent lessons after it was first introduced.

As late as April 15, it was apparent that the children needed much more work on tones in the bass staff and the treble staff. Constant reviewing was done on the names of the lines and spaces for both treble and bass staves.

Individual confidence in both singing and playing was noticed in the children as the program progressed. They were eager to sing and play

alone or in small groups for the rest of the class.

The ability to improvise and make up tunes at the keyboard improved steadily. During the last month of instruction, many children could "improvise on the spot" and create tunes that showed an AB or ABA form, repetition of motives and phrases, and closed with a final cadence. All children were eager to play their improvisations for the rest of the class.

Significant Findings

Resulting from the project were these four significant findings:

1. The majority of the children involved in the project entered the school instrumental music program in the Fall of 1968.

2. The two classroom teachers involved in the project gained interest and confidence in participating in the music program.

3. There was an increased interest on the part of the children in the music program.

4. There was increased family interest in the school music program, as evidenced by the attendance at open house demonstration, and the questionnaire returns from the parents.

Looking to the Future

To date, outcomes resulting from this Federal project have taken the form of four cooperative projects between school districts and the C. G. Conn Corporation. The four projects, all begun at the start of the 1968-69 school year, September, are in the following districts:

Hayhurst Elementary School, Portland, Oregon
Mr. A. V. Magaurn, Principal
Dr. A. Verne Wilson, Director of Music, Portland Public Schools

Jefferson Park Elementary School, Tucson, Arizona
Mrs. Frances McCray, Principal
Dr. Max Ervin, Director of Music
Dr. Carroll Rinehart, Coordinator of Elementary Music

Central Junior High School, Kansas City, Missouri
Dr. Edward E. Fields, Principal
Mr. Roy E. Tharp, Director of Music, Kansas City Public Schools

Brooks Junior High School, Wichita, Kansas
Dr. Lawrence Bechtold, Principal
Mr. Art Harrell, Director of Music

The purpose of these projects is to bring modern electronic technology into the school music program, permitting complete instructional flexibility and immediate feedback for group and individual learning needs during any class period. In each case, the principal, director of music, and the central school district administration expressed interest in using the Conn Music Learning System, and requested its use. These local people in each case determined their school district's needs, in which school the equipment would be placed, and which music specialists and classroom teachers would be chosen to work with the Conn facility. The Conn Music Learning System was to be used as an additional instructional resource to the regular general music class and such additional innovative use as approved by the school administration. The Conn Corporation agreed to furnish the equipment, its maintenance, and consultant resource for one year. The school district agreed to use the facility in its regular school music program to integrate with and extend the use of its present equipment resources in improved music learning and creative instructional techniques.

A Follow-up Report (at S. F. State College, Fall 1968-69)

A report of the follow-up at San Francisco State College concerning music activities related to the use of the Conn Music Learning System shows that Mrs. Vernazza extended the work done by the third grade and fifth grade children at Frederic Burk Elementary School into the teacher preparation program at the college. A copy of the report for the Fall Semester, 1968-69 follows:

EXTENSION OF KEYBOARD USAGE IN TEACHER TRAINING
FALL 1968-69

In the Fall Semester a training program for teachers of keyboard (as well as teachers of music fundamentals at the keyboard) was instituted at San Francisco State College. The course called "Techniques of Teaching Piano Classes" was the core of the program. There were thirteen upper division and graduate students enrolled. The course was taught by Mrs. Vernazza.

A beginning class in piano and fundamentals was used as a demonstration class. There were eleven non-music major or minor students in this class. It was also taught by Mrs. Vernazza.

The Conn Keyboards were used in both classes mentioned above, thus supplementing the regular classroom equipped with eleven pianos.

Use in Teacher Training Class

Uses of Conn facility were demonstrated by Mrs. Vernazza. Students explored keyboards using piano literature, scales, chords, motives, phrases.

Each student practiced using the Master console and its earphone communication system in addition to individual and ensemble performance with the loud speakers of the student keyboards.

Each student conducted some class sessions in teaching music fundamentals at the keyboard while other members of the class were at the student keyboard stations.

Keyboard laboratory was made available to the students for practice and exploration.

Students were encouraged to use the Conn Music Learning laboratory when preparing their term paper which was directed toward plans for beginning teaching.

APPENDIX A

DESCRIPTION OF THE CONN MUSIC LEARNING SYSTEM

The Conn Music Learning System is a multiple electronic keyboard system designed for application in elementary, secondary and university level music instruction. It consists of a teacher console and up to 24 student stations that permit students to see, as well as hear, the notes they play in learning music. The Conn Music Learning System is specifically designed for flexible group or individual classroom use, permitting the teacher to see and hear the students' performance.

The Conn Music Learning System is innovative in providing a single pitch source from the master console for every note on each of the 24 student keyboards, thus guaranteeing a perfect unison pitch of any note played on all keyboards.

Each student station may be used independently for individual study and practice or may be used in any combination of the 24 stations, either over the headphones or as a performing ensemble using the speaker at each student station.

The organ concept with its sustained tone was selected for the Conn Music Learning System. It eliminates for the beginner the problem of finger control on piano-action keyboards and adds the resource of exact control of tone volume and duration in depressing and releasing keys.

The Conn system provides a unique medium for music instruction at all student levels. It provides new dimensions in teaching note identification, scales, intervals, chords, rhythm, melody and harmony--as well as in teaching preliminary keyboard method. It may also be easily

adapted and applied toward greatly strengthening the program of instrumental, vocal and general music classes.

The music learning system is compact, versatile, flexible and completely portable.

The Teacher's Console

The teacher's console houses the communications control panel, master tone generator for the entire system, lighted music staff and the 44-note sustained-tone keyboard, with following range on all keyboards of the system:

The communications panel contains the master control for the intercom system, which provides two-way voice, plus keyboard, communication with every student station, and auxiliary inputs for the instructor's microphone-headset and tape deck or record player.

A special feature of the teacher's console is that the instructor may monitor any student or group of students, without the student's knowledge, both visually, via the lighted music staff, and audibly, through the earphones.

In addition, the teacher's console has an automatic volume cutback, which decreases the keyboard volume of any student or group of students with whom the instructor wishes to communicate.

The teacher's console also contains an automatic delayed turn-off device, which will shut off the entire system after an extended period of inactivity.

The Student Station

Each student station contains a 44-note keyboard, lighted music staff, expression pedal, speaker, headphone, four timbre voicing control and a flexible intercom system.

One unique element of this Conn student station is its lighted music staff, mounted above the keyboard. Lights on the staff respond to notes played by the student and permit him to see the notes on the treble or bass clef staff, as well as hear the music he is playing.

Another outstanding feature of the student station is the sustained-tone keyboard, which permits exact control of tonal duration at any desired volume. Flexible use of loudspeaker or headphones permits your choice of audible classroom sound through speaker, or silent classroom study through headphones.

Each student station is also equipped with an auxiliary outlet. It may be used for a second headphone to permit another student to listen or play duets, for the teacher to monitor, or to record student's performance.

The innovative aspect of the Conn facility is an immediate change from a group teaching situation to an individual one-to-one relationship by means of the keyboard and earphones.

APPENDIX B

DESCRIPTION OF THE FILM, BROCHURE, FILM #1

Description of the Film

The film, "Integration of the Systems Approach and Electronic Technology in Learning and Teaching Music, " is in black and white and runs 24 minutes. This television film was transferred from a video tape showing two elementary school classes learning music through the Conn Music Learning System, which relates singing, playing the Conn electronic keyboard instrument and the recorder. The film was made possible through a Federal Grant from the U. S. Office of Health, Education and Welfare for a project on the campus of San Francisco State College at Frederic Burk Elementary School to develop an effective music learning system using the resource of new electronic technology.

The purpose of the film is to show chronologically the approach a third grade class and a fifth grade class used to learn music. The children learn to play the Conn Music Learning Facility, consisting of a master console used by the teacher, and 24 student keyboard stations used by the children. Unique features of the Conn instrument are:

allows the instructor immediate two-way communication with individuals or the entire class;

allows immediate feedback from student to teacher;

allows two students to work together at the same keyboard through the use of earphones;

maintains perfect pitch of all tones on all keyboards;

may be used with or without headphones in any of four different tone colors.

The children sing and play the recorder as well as the Conn keyboard instrument.

The film shows the children in a classroom situation, learning music with the help of the music specialist and the classroom teacher. Although no lapse of time is formally announced during the film, it is inferred as the children begin with their first learning experiences of becoming acquainted with the keyboard, playing tonal patterns from familiar songs, playing simple five-finger melodies, with either hand and both hands, playing a melody in the right hand and an accompanying chord in the left hand, and playing melodies involving both hands.

Film Sequence

The film begins with a short verbal introduction by Dr. William E. Knuth, the educational consultant who helped to develop the Conn Music Learning Facility. His remarks are followed by a brief visit of the principal of the Frederic Burk Elementary School, Dr. Leonard Meshover, and Dr. Knuth to a fifth grade classroom during a music lesson.

Next, the film moves to a simulated classroom situation in a television studio, and shows a chronological sequence of music learning by a third class over a five-month period. Musical learnings illustrated in this sequence are:

playing melodic and rhythmic patterns during keyboard exploration

developing early music reading with the help of lights on the individual keyboard chart panel of the Conn instrument, as well as from musical notation

teaching through the intercom of the Conn instrument

developing tonal memory

singing and playing the recorder to reinforce music learning

transposing a melody

introducing a chord as accompaniment to a melody

The sequence of the fifth grade class follows the third grade, and shows in a similar fashion their chronological development of music learning over a five-month period. Songs are sung and played to bring about these skills:

feeling the basic pulse

learning the meaning of rests

playing tonal patterns

using a chord to accompany a melody

transposing a melody

teaching through the intercom

imitating a melody involving right and left hands at the keyboard

improvising individually

reinforcing musical concepts through singing and playing the recorder and at the keyboard

Both the music specialist and the classroom teacher are present in the third grade and fifth grade sequences. All the members of each class participated in the film. No selection of students was made. The entire third grade class with their teacher, Mrs. Jean Pierce, and the entire fifth grade class with their teacher, Miss Julie Juracek, participated in the five-month music learning project. The music specialists, Mrs. Marcelle Vernazza,

Associate Professor of Music, San Francisco State College, taught the third grade class, and Dr. Alice M. Knuth, Professor of Music, San Francisco State College, taught the fifth grade class.

The film may be shown to children, teachers, or parents and interested adults. The filming took place in Studio I of the Radio-Television-Film Department of San Francisco State College.

APPENDIX C

KNUTH MUSIC ACHIEVEMENT TEST
Div. 1, Form A - Pre-test Div. 1, Form B - Post-test

Teacher A - Treatment Third Grade Class - Frederic Burk Elementary School
San Francisco State College

Pupil	Pre-test Score	Post-test Score	Score Gain
1	19	31	012
2	15	04	-11
3	12	23	011
4	11	20	009
5	09	17	008
6	09	00	-08
7	08	23	015
8	07	19	012
9	07	13	006
10	07	16	009
11	05	03	-02
12	04	13	009
13	03	05	002
14	03	03	000
15	01	03	002
16	00	11	11
17	00	00	000
18	00	16	016
19	00	03	003

Pre-test: N=19
Mean=6.32

Post-test: N=19
Mean=11.74

KNUTH MUSIC ACHIEVEMENT TEST

Div. 1, Form A - Pre-test Div. 1, Form B - Post-test

Teacher B - Conventional Third Grade Class - Frederic Burk Elementary S
San Francisco State College

Pupil	Pre-test Score	Post-test Score	Score Gain
1	21	25	004
2	13	12	-1
3	12	15	003
4	11	11	000
5	08	04	-4
6	07	13	005
7	05	04	-1
8	05	03	-2
9	04	05	001
10	03	00	-3
11	03	05	002
12	01	00	-1
13	01	05	004
14	00	08	008
15	00	07	007
16	00	00	000
17	00	11	011
18	00	07	007
19	00	00	000
20	00	11	011
21	00	03	003

Pre-test: N=21
Mean=4.48

Post-test: N=21
Mean=7.10

KNUTH MUSIC ACHIEVEMENT TEST
Div. 1, Form A - Pre-test Div. 1, Form B - Post-test
Teacher A - Treatment Fifth Grade Class - Frederic Burk Elementary School
San Francisco State College

Pupil	Pre-test Score	Post-test Score	Score Gain
1	31	39	008
2	31	35	004
3	29	32	003
4	29	32	003
5	27	28	001
6	24	27	003
7	23	15	-08
8	21	31	010
9	20	19	-01
10	19	31	012
11	16	21	005
12	16	28	012
13	13	23	010
14	13	19	006
15	12	27	015
16	11	05	-06
17	11	24	013
18	09	21	012
19	09	08	-01
20	07	12	005
21	05	03	-02
22	05	04	-01
23	03	11	008
24	01	27	026
25	00	00	000
26	00	00	000
	Pre-test: N=26 Mean=14.38	Post-test: N=26 Mean=20.77	

KNUTH MUSIC ACHIEVEMENT TEST

Div. 1, Form A - Pre-test Div. 1, Form B - post-test

Teacher B - Conventional Fifth Grade Class - Frederic Burk Elementary School
San Francisco State College

Pupil	Pre-test Score	Post-test Score	Score Gain
1	37	39	002
2	36	32	-4
3	32	37	005
4	31	37	006
5	31	37	006
6	27	33	006
7	25	32	007
8	25	31	006
9	24	20	-4
10	20	32	012
11	20	25	005
12	19	31	012
13	17	19	002
14	13	08	-5
15	12	17	005
16	12	11	-1
17	11	15	004
18	11	12	001
19	11	23	012
20	08	15	007
21	04	24	020
22	04	08	004
23	03	00	-3
24	03	17	014
	Pre-test: N=24 Mean=18.17	Post-test: N=24 Mean=23.04	

3RD GRADE - TREATMENT GROUP - RANK ORDER

Student	Knuth Tests Gain Score	Knuth Mus. Ach. Tests Pre-test	Post-test	Keyboard Performance	Recorder Performance	Singing
1	3.5	1	1	6.5	2.5	5
2	19	2	13	6.5	2.5	5
3	5.5	3	2.5	6.5	17.5	5
4	8	4	4	17.5	6.5	1.5
5	10	5.5	6	19	4.5	13.5
6	18	5.5	18.5	17.5	9	19
7	2	7	2.5	6.5	9	9
8	3.5	8	5	12	12.5	13.5
9	11	9	9.5	12	17.5	5
10	8	10	7.5	15	6.5	11
11	17	11	15.5	6.5	15	13.5
12	8	12	9.5	1.5	9	5
13	13.5	13.5	12	6.5	12.5	17
14	15.5	13.5	15.5	1.5	12.5	1.5
15	13.5	15	15.5	6.5	2.5	9
16	5.5	17.5	11	15	16	13.5
17	15.5	17.5	18.5	12	4.5	17
18	1	17.5	7.5	15	12.5	17
19	12	17.5	15.5	6.5	19	9

FIFTH GRADE - TREATMENT GROUP - RANK ORDER

Student	Knuth Tests Gain Score	Knuth Mus. Ach. Tests Pre-test	Knuth Mus. Ach. Tests Post-test	Keyboard Performance	Recorder Performance	Singing
1	9.5	1.5	1	3	7.5	21
2	13	1.5	2	7.5	2	19.5
3	15	3.5	3.5	11.5	15.5	23.5
4	15	3.5	3.5	7.5	15.5	13.5
5	17	5	7.5	3	21.5	4.5
6	15	6	10	16.5	12	23.5
7	26	7	18	16.5	14	13.5
8	7.5	8	5.5	3	21.5	2.5
9	21	9	16.5	3	21.5	9.5
10	5	10	5.5	7.5	2	9.5
11	11.5	11.5	14.5	16.5	7.5	13.5
12	5	11.5	7.5	3	4	1
13	7.5	13.5	13	7.5	7.5	13.5
14	24.5	13.5	16.5	16.5	7.5	17
15	2	15	10	absent	absent	absent
16	24.5	16.5	22	23	21.5	17
17	3	16.5	12	11.5	2	17
18	5	18.5	14.5	absent	absent	absent
19	21	18.5	21	20.5	12	9.5
20	11.5	20	19	11.5	21.5	6.5
21	23	21.5	24	11.5	7.5	6.5
22	21	21.5	23	16.5	12	2.5
23	9.5	23	20	20.5	21.5	18.5
24	1	24	10	22	7.5	4.5
25	18.5	25.5	25.5	16.5	18	9.5
26	18.5	25.5	25.5	24	17	22

APPENDIX D

TEACHER-MADE TEST

Name_____ Class ____ Teacher _____ Date: 3/13/(

1. Did the song begin like 1 or 2 shown below? Circle the numeral of your choice

1. 

2. 

2. Write the words for this rhythmic pattern: 

3. How many times does the pattern appear in the song? Underline your choice.

Twice Once Four times

4. What could we count for the beats in the song? Circle the right answer below:

1 2 3 4 1 2 3

5. Write the words for the melodic pattern shown on the staff at the right: 

6. You will hear two musical examples. Did the song end like the first or the second? Circle your choice below:

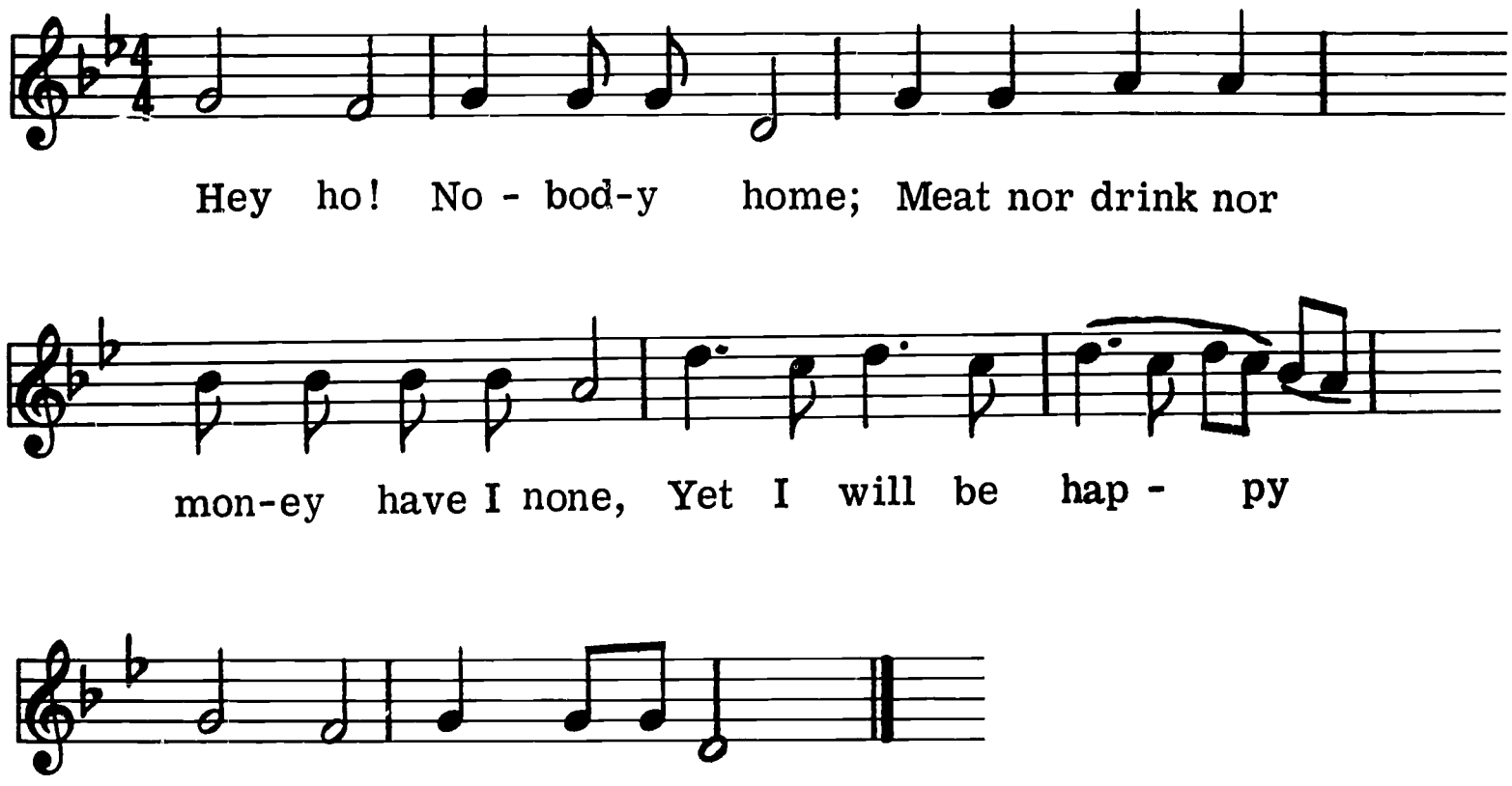
First Second

7. Did you hear any repetition in the song? Was any part of the melody heard more than once? Write an X after one of the answers:

Yes _____ No _____

8. There were 7 𝅗𝅥 (half notes) in the song. Each half note receives two beats. They were the long tones in the song. Think the melody to yourself and write the words for each half note shown below:

HEY, HO! NOBODY HOME



TEACHER-MADE TEST

PERFORMANCE TEST RESULTS — 3RD GRADE - TEACHER A

PUPIL	KEYBOARD	RECORDER	SINGING
17	1	1	4
1	1	1	1
14	1	1	1
2	2	1	1
15	1	1	1
10	2	1	1
16	1	3	2
6	3	2	3
9	2	5	2
4	3	1	1
19	1	(5)	1
12	1	1	1
3	1	4	1
8	1	2	2
13	1	-	3
18	2	2	3
7	2	1	1
11	1	2	2
5	3	1	2

Rating Scale

High 1 - 2 - 3 - 4 - 5 Low

(The numeral identifying each pupil is the one given him in rank order on the Knuth pre-test.)

TEACHER-MADE TEST

PERFORMANCE TEST RESULTS 5TH GRADE - TEACHER A

PUPIL	KEYBOARD	RECORDER	SINGING
1	1	1	4
16	4	lost recorder	3
21	2	2	1
26	5	5	5
19	3	3	3
11	2	2	2
6	2	3	cold
24	3	2	2
12	1	2	1
7	2	1	2
20	1	"I can't"	1
13	1	2	3
8	1	?	1
14	2	2	3
4	1	1	2
2	1	1	4
25	2	5	1
9	1	1	1
22	3	3	1
10	1	2	1
5	1	sore thumb	1
23	2	"Do I have to?"	4
3	1	3	"I don't want to"
17	1	1	1

Rating Scale

1 - 2 - 3 - 4 - 5

High Low

(The numeral identifying each pupil is the one given him in rank order on the Knuth pre-test.)

TEACHER-MADE TEST RESULTS

FIFTH GRADE, TEACHER A, TREATMENT GROUP — MARCH 13, 1968

Song Test, "Hey Ho! Nobody Home"

PUPIL	SCORE
5	84
1	78
4	78
15	74
14	72
3	72
25	70
12	70
23	68
8	68
9	64
7	62
16	62
18	58
21	54
10	52
17	52
6	50
19	50
2	48
13	42
11	46
20	40
26	35
22	32
24	26

N = 26
Perfect Score = 84
Range = 58
Mean = 57.96
S.D. = 15.43
T = -1.72
p .10

(The numeral identifying each pupil is the one given him in rank order on the Knuth pretest.)

TEACHER-MADE TEST RESULTS

FIFTH GRADE CLASS, TEACHER B, CONVENTIONAL GROUP 3/13/68

Song Test, "Hey Ho! Nobody Home"

PUPIL	SCORE
4	84
5	84
2	84
6	84
7	84
8	84
14	82
1	74
3	74
9	74
10	74
12	72
13	64
21	64
16	60
11	58
17	56
15	56
24	56
20	52
18	50
19	48
23	48
22	41
25	30

N = 25
Perfect Score = 84
Range = 54
Mean = 65.48
S.D. = 15.70
T =

(The numeral identifying each pupil is the one given him in rank order on the Knuth pre-test.)

APPENDIX E

QUESTIONNAIRE FOR PARENTS

Dear Parent:

We should like to find out if the music program this year has been worthwhile for your child and what his attitude toward the program is. Will you please answer the four questions listed below:

1. How would you rate the progress your child has made in the music program since November 1967? (Please check one.)

a. very high _____
b. high _____
c. medium _____
d. low _____
e. very low _____

2. How interested is he in the music program and how important is it to him (her)? (Please check one.)

a. very high _____
b. high _____
c. medium _____
d. low _____
e. very low _____

3. What do you notice in how he does and what skills he has developed? (Please check one for each item below.)

a. Plays the keyboard--
   much improvement ____
   some improvement ____
   about the same as before ____

b. Sings--
   much ____
   some ____
   about same ____

c. Plays the recorder--
   consistent progress ____
   some progress ____
   little progress ____

4. What evidence does he give of using his skills in **recreation** or leisure time? (Please check one for each item below.)

a. Sings--
   every day ____
   once or twice a week ____
   not at all ____

b. Plays recorder--
   every day ____
   once or twice a week ____
   not at all ____

c. Plays keyboard--
   Is there a piano or keyboard instrument in your home? ____

   If so, does your child play it--
   every day ____
   once or twice a week ____
   not at all ____