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The effects of electronic piano instruction on sixth-grade middle-school students' music-reading skills

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THE EFFECTS OF ELECTRONIC PIANO INSTRUCTION ON SIXTH-GRADE MIDDLE-SCHOOL STUDENTS' MUSIC-READING SKILLS

By

Ronald Bruce Moss

A Dissertation Submitted to
The Faculty of the Graduate School at
The University of North Carolina at Greensboro
In Partial Fulfillment
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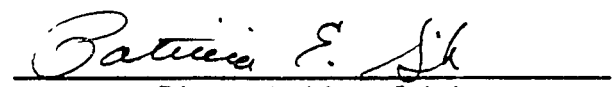

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The purpose of this study was to investigate the effects of electronic piano instruction on music-reading skills of sixth-grade general music students in a middle school in Forsyth County, North Carolina. Electronic piano instruction and vocal instruction were compared to determine the efficiency of either type of instruction for increasing aural-visual pitch and rhythm discrimination skills. Students with prior outside-of-school piano experience were compared to students with no prior piano experience to determine which group would benefit from either instructional type.

One middle-school general music specialist was chosen randomly from a list of twelve teachers currently teaching in the school district. At the beginning of the 1986-87 academic year, subjects (N=107) within previously scheduled general music classes were designated as either experimental electronic piano groups (N=58) or control vocal groups (N=49). The participating general music specialist taught all classes.

Subjects were pretested, and after ten weeks of instruction, posttested by identical measures of Colwell's (1968) Music Achievement Test 2: Auditory-Visual Discrimination (MAT). Pitch and rhythm subtests of the MAT were combined to form a composite music-reading measure.

Pretest and posttest scores were analyzed to determine entry level scores by class and to compare posttest scores across two independent variables: instructional treatment, and prior piano experience.

Posttest scores were analyzed employing a 2 X 2 Analysis of Covariance to control for pretest differences and to increase precision for testing the null hypotheses. Both pitch and rhythm scores were then analyzed separately across the two independent variables to determine significance of the main effects and any interaction of the variables.

Results of the analyses revealed that electronic piano instruction significantly ($p = .0001$) increased subjects' composite music-reading ability. The effect of prior piano experience on subjects' music-reading scores was found to be nonsignificant ($p = .1731$), except that prior piano experience was significant ($p = .0139$) on subjects' rhythm-reading scores. No significant interactions between the two variables were found.

Electronic piano instruction was determined to be more effective for improving sixth-grade middle-school students' music-reading skills than vocal instruction over a ten-week instructional period, especially for those students who had no prior piano experience. Detailed lesson plans for both types of instruction are included in the appendices.

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CHAPTER I

INTRODUCTION

The purpose of this study is to investigate effects of electronic piano instruction on music-reading skills of sixth-grade general music students in a middle school. Although general music teachers employ various instructional methods and performance techniques for developing music-reading skills, for purposes of this study, electronic piano instruction and vocal instruction are compared for developing music-reading skills. Electronic piano instruction, as described in this study, emphasizes locating pitches, root-position triads and their inversions, performing major and minor scales, locating tonic tones of different keys, and performing music with and without accidentals. Vocal instruction, as described in this study, emphasizes pitch matching and reading music by intervals or scale degrees. Effects of vocal instruction and electronic piano instruction on selected music-reading skills are measured by aural-visual pitch and rhythm discrimination tests. Selected music-reading skills are defined operationally as a subject's ability to discriminate between the accuracy of written music notation and an aural presentation (a recorded performance) of the notation. The

investigation is limited to general music class instruction for sixth-grade middle-school students.

Background of the Problem

Frequently, music educators and researchers report problems associated with teaching music reading skills to middle school students in general music classes (Caissy, 1985; and Swanson, 1984). Researchers have demonstrated that middle school students (ages 11 to 14) are in a critical mental and physical transition from childhood to adolescence (Bigner, 1983; Klingele, 1979; Stone & Church, 1979). Caissy (1985) reported that early adolescent students frequently appear moody, are difficult to motivate, and rely on peer approval rather than adult approval to reinforce their self-esteem. She also noted that students in middle schools are at diverse developmental stages within the same grade level. Middle-school males are often reluctant to participate in vocal performances due to their changing voices (Cappers, 1985; Lawrence, 1980). Middle-school students are in a period of limited brain growth (Strahan & Toepfer, 1984). Because of these limitations, students need to explore music and refine previous skills rather than be introduced to new music concepts (Caissy, 1985). Middle-school students need additional performance activities to enhance music-reading concepts that are developed in elementary school music instruction (Zimmerman, 1986). Problems associated with middle-school general music students

differ considerably from problems associated with elementary students.

Rote singing activities, often associated with elementary school music instruction, are less desirable for teaching music-reading skills to middle-school students (Metz, 1980). "Even though rote teaching may be necessary for preparing performances, the problem is that rote learning fosters dependence rather than independence" (Metz, 1980. p. 59).

Bennett (1984) maintained that middle-school students in particular can deceive a general music teacher by imitating classmates' music performances rather than reading music independently. These "tricks" are products of rote teaching frequently associated with elementary general music instruction. General music classes are the initial courses for introducing elementary students and some middle school students to music (Bessom, Tatarunis, & Forccuci, 1974). Ultimately, the purpose of general music classes is to develop knowledgeable and skillful performers, composers, and consumers of music who use music wisely to enhance the quality of their lives (Weidensee, 1986). Bennett (1984) advocated teaching music-reading as a primary means to develop music independence and literacy. The current study compares the effects of electronic piano instruction and vocal instruction on developing selected music-reading

skills, thereby increasing music literacy during a critical time of preadolescent growth and development.

The Importance of Music-Reading Skills

Petzold (1963) stated, "Skill in music-reading is considered an essential element of both music understanding and appreciation, and of independent musical performance" (p. 4). Throughout professional music education literature, the development of music-reading skills is supported as an important goal of music educators (Mark, 1986). Music is a unique language within a unique system of visual symbols; thus, a familiarity with music notation enables an individual to progress from a dependent learner to an independent learner. Music literacy was defined by Bessom et al. (1974) as "the ability to read and write music notation" (p. 83). Weidensee (1986) described the musically literate individual as a person who skillfully performs music by applying concepts of his or her understanding of music theory, and of cultural and historical periods of music.

A National Commission on Instruction Report (NCI 1974, p. 7) supports the premise that music-reading instruction promotes the development of musically independent individuals. The NCI Report describes the musically independent individual as being able to ". . . make music alone and with others, improvise and create music and use the vocabulary and notation of music" (p. 4-5). According to Jordon-DeCarbo (1986), reading music is considered one of

several important objectives in music education for developing a sensitive and literate student.

The NCI Report (1974) divides general music study into three basic experience categories: (1) experiences involving the creation and organization of music; (2) experiences involving participation in music performances both individually and in groups; and (3) experiences involving music perceiving, analyzing, and describing. Performing, creating, listening, and describing music appear to be essential activities at every grade level. Music-reading skills develop from kindergarten to sixth-grade or beyond by experiences that involve describing music. Describing experiences includes the use of music terminology, drawing or building visual icons to represent rhythm or pitch, and the use of traditional and contemporary music notation (NCI, 1974).

During the early 1900s, one of the principal goals of music education in the United States was to develop music-reading ability (Nye & Nye, 1985). Today, music-reading is valued as a functional skill necessary for participating in performing ensembles and for developing music theory knowledge and analytical skills. Music performance in middle schools is one means for combining music-reading skills and knowledge which will contribute to an individual's overall development (Wiedensee, 1986).

Nye and Nye (1985) reported that students develop music skills and knowledge by investigating the rhythmic and tonal characteristics of music such as tempo, duration, dynamics, melodic contour, and harmonic relationships. Such investigations should be structured and organized sequentially throughout all levels of music instruction in public schools (Nye & Nye, 1985). Once students can readily associate music patterns learned through rote learning or listening, the next step is to associate aural patterns with visually presented icons, and ultimately, with traditional notation of the music patterns. Aural-discrimination processes advancing to aural-visual discrimination processes are initial stages for developing music-reading skills in middle school grades. This instructional progression is referred to as "the rote to note approach" or the "sound to symbol" approach (Shehan, 1986; Jordon-DeCarbo, 1986).

To emphasise the value of music in education, adminstrators and curriculum planners often parallel music- and language-reading skills. While the amount of music-reading required in music instructional programs may vary, a relationship exists between reading skills and music independence that resembles the way in which reading and writing words relate to verbal literacy (Tucker, 1981).

In practice, there is disparity in the amounts of class time devoted to developing music-reading skills. When music educators devote a significant portion of class time to

developing aural-visual discrimination skills, it is indicative of the value they place on developing music reading skills. Conversely, small amounts of class time devoted to developing such skills suggest that either a music educator considers music-reading skills at a minimal value, or there are nonmusical factors limiting class time for developing music reading. Bennett (1984) wrote:

> Whether the ultimate goal of music reading lives at the heart or on the fringe of any music instructional program, an informed teacher who uses time efficiently is imperative. The investment of time and effort to develop independent music-reading skills in our students can have returns that will ultimately serve the individual, the teacher, and the group in the performance and knowledge of music. (p. 69)

According to Elliott (1982), debate over the importance of music-reading instruction fluctuates among music educators between total commitment to reading instruction and a deemphasis of reading instruction. Elliott maintained that some educators believe that music-reading is an overstated objective and impossible to teach effectively to the majority of students. Other educators contend that an understanding of music symbolism is a primary requirement for fostering music independence and literacy.

Regardless of individual philosophies, music reading remains a primary goal for developing music independence and literacy for middle school students. Klotman (1978) supported the premise that developing music-reading skills increases students' appreciations of music and motivates them

to continue music studies. Therefore, increased motivation and music appreciation are primary reasons for developing music-reading skills in middle-school general music classes. The current study has evolved from this premise.

The Developmental Sequence for Music-Reading

Developing music-reading skills in middle schools is a general music class objective related to developing music independence and literacy. Zimmerman stated, "The child's earliest music experiences should be viewed as a continuum from nonliteracy in music to music literacy" (p. 29). The need for reading skills arises from a development of aural responsiveness. Preschool and elementary students learn to perceive, discriminate, and remember aurally presented music, preparing them for the functional uses of notation, which are necessary for music performance and interpretation (Zimmerman, 1986).

Some music educators maintain that there is a learning sequence for music-reading (Jordon-DeCarbo, 1986; Petzold, 1963; & Zimmerman, 1986). An initial step is to develop aural skills, which is learning to discriminate among music patterns (e.g., major from minor, diatonic scale tones from non-scale tones). Pattern variations may include changes in interval relationships within scales, durations of tones within patterns, and pitch directions within patterns. By age 8, students generally develop a vocabulary for communicating verbally these music variations. As students

progress in aural skill development, they learn to label and categorize music events and then to associate the visual music symbols with aurally presented patterns (Zimmerman, 1986). The latter skill is often referred to as a music reading skill.

Development of music behaviors corresponds with developmental stages occurring from infancy through adulthood. Children perceive and remember music by different processes at different ages. Children learn to listen to the music initially, match what they hear and see by imitation, and then associate visual representations with what is heard (Zimmerman, 1986).

As children increase their verbal abilities, their abilities to apply music-reading concepts also increase. Zimmerman (1970) maintained that passive learning is counterproductive even for teaching young children. To develop aural and aural-visual skills, children need opportunities to experience music concepts through a variety of performance situations. Klingele (1979) wrote that middle-school students (ages 11 to 14) show an increased ability to generalize and apply deductive reasoning. Middle-school students prefer active to passive learning. Furthermore, approval and acceptance by peers are important to middle-school students. As children approach adolescence, they need challenges and opportunities to apply music-reading skills learned at younger ages (Regelski, 1981).

Instructional strategies which incorporate active learning, peer interaction, and applications of music-reading to music performance are required to conform to middle-school students' needs. Such instructional strategies include participation in group piano instruction.

One of the major contributors to codifying music learning sequences is Gordon (1984), who developed a theory for engaging student's appreciation of music actively through a process called "audiation." Gordon defined audiation as an ability to "pre-hear" a music pattern by memory. Pre-hearing is the ability to hear music relationships internally without the external presence of music.

Through the process of audiation, students learn to associate unfamiliar music patterns with familiar music patterns (Gordon, 1984). Gradually students increase abilities to learn new music through aural associations and develop an "eye to ear association." As students increase their ability to audiate music, their music appreciation increases. Gordon (1984) maintained that there is a strong relationship between audiation and continued music growth:

> When students are able to listen to music in a meaningful way, they have already developed basic audiation as a readiness for appreciation. And if basic audiation has been developed for appreciation, it serves equally well as readiness for developing notational audiation. Considering the extent to which musical literacy serves as a readiness for the development of more complex dimensions of appreciation, it seems wasteful not to teach students to become musically literate. (p. 5)

Bruner (1966) maintained that skills with and knowledge of music notation are developed in three progressive learning stages which include the enactive, iconic, and symbolic modes of learning. Bruner (1966) theorized that each learning stage was associated with ways children represent the aural and visual environment around them. Bruner's theory supports developing students' music-reading skills by progressing from experiencing music concepts through movement to experiencing music concepts symbolically as represented in music notation. Bruner's model for understanding music symbols is based on developing intuition and problem-solving skills. Children first hear the music and experience it enactively through bodily movement. As children develop, aurally presented music concepts and associated movements are continued through the use of icons. The symbolic stage of development involves associating aural and iconic representations of music rhythms and tones with music symbols or traditionally used music notation.

Bruner's learning theory supports the process of intially developing music-reading skills through rote experiences and progressing toward applying knowledge acquired by rote to reading music notation. The current study focuses on the music notation reading stage of this progression. The symbolic stage often occurs among the middle school ages when students apply aural-visual discrimination skills to developing music reading skills.

Bessom et al. (1974) also advocated improvisation and composition as beneficial to applying music-reading concepts for junior-high students. To what extent can selected music-reading skills be developed during the beginning middle-school year? As students begin middle school music classes, they are mixed together from different elementary school music backgrounds. Since sixth grade is the final year of required music instruction in many educational curricula, it is an important time to strengthen previously acquired music reading skills and to offer opportunities to apply those skills and thereby encourage further music growth and development.

Music-Reading Evaluation

Generally, music reading skills are measured by one of three types of behaviors: (1) playing or singing written music notation; (2) identifying music clefs, lines and spaces, metric structures and dynamic markings; and (3) correctly associating what is heard with what is seen through aural-visual processes. A common method for measuring students' general music achievement is to test their ability to read music notation associated with rhythmic and pitch patterns in music. "Aural-visual music skills require an interaction of hearing and sight" (Boyle & Radocy, 1987, p. 160). One method of evaluating reading skills is to have students locate errors in the pitch and rhythm notations when compared to aural presentations of these patterns.

Frequently, aural-visual discrimination skills are measured by pencil-and-paper tests and may include either rhythmic or pitch elements of music.

Performing, recognizing music symbols, and associating visual patterns with aural patterns require a knowledge of notation including the clefs, lines and spaces, notes and rests, rhythmic durations, and dynamic and tempo markings. Boyle and Radocy (1987) reported that students who can read music must be able to apply their knowledge of music symbols to performing the symbols. Another procedure for evaluating an applied knowledge of music-reading skills is for students to associate what is heard with what is seen (discrimination). Aural-visual discrimination tests involve music dictation, or identifying missing pitches or rhythm in relation to aural presentations of music.

For purposes of this study, a pitch and rhythm aural-visual discrimination test has been chosen as the measure of music-reading skills. The aural-visual pitch and rhythm discrimination subtest from the Music Achievement Test: Level II by Colwell (1968) is used to measure sixth graders' music-reading skills.

Group Piano Instruction

Researchers have determined that group piano instruction is an effective strategy for developing music-reading skills (Gaston, 1940; Pace, 1967; Wig & Boyle, 1985). Each octave on the piano has an identical visual

pattern of black and white piano keys. Music-reading skills, in part, may be enhanced by this visual and spatial arrangement. The piano also is a useful instrument for developing knowledge of harmony and intervals. Thus the assumption is made that group electronic piano instruction is a potentially useful instructional strategy for music educators to accommodate diverse music-reading skills.

There are several advantages for using keyboards in public school general music classrooms such as developing spatial cues for interval distances, tonal patterns, and cadence patterns. Pianos are valuable tools for composing and improvising, and allow students to experience harmony and melody simultaneously. Electronic piano instruction may be used to develop music-reading skills in sixth-grade general music classes.

According to Lathrop (1970), reading music is also related to tactile memory. Associating aural concepts of music with tactile sensations enhances the development of aural and aural-visual discrimination skills. Combining tactile sensations with aural-visual skills strengthens concepts of melody and harmony. Melodic and harmonic intervals and major or minor scale patterns can be understood and applied to the spatial arrangements of the piano (Pace, 1967).

Gaston (1940) claimed there is a visual link between what is seen in music notation and what is heard when the

music is performed on a keyboard instrument. He maintained that music-reading skills and knowledge are enhanced by the spatial separation and organization of piano keys. A piano provides multisensory cues that enhance a student's music learning (i.e., aural, visual and tactile cues are presented simultaneously). Gaston maintains that the piano is a beneficial tool for composing in that all orchestral registers are represented on the piano. The music instrument chosen to develop music-reading strategies may be a significant factor influencing the amount of music reading achievement. The current study focuses on the efficacy of using group electronic piano or vocal instructional strategies for developing sixth-grade students' music-reading skills. The selected music-reading skills investigated in this study include aural-visual pitch and rhythm discrimination skills.

Value of the Study

The question of degree to which music-reading skills are attained by middle-school students remains unanswered. Instructing middle-school students in music-reading skills on a variety of musical instruments may increase their chances for becoming independent music learners. If any instructional strategy or combination of strategies benefits middle-school students' music-reading skills, then investigating these strategies within a general music setting

is important and should contribute to developing effective music instructional programs.

Piano instruction has been reported to enhance music-reading skills across several age groups. However, a few questions remain unanswered. Does group electronic piano instruction increase sixth-grade students' pitch and rhythm reading skills in general music classes? What are the effects of prior piano training on the subsequent development of music-reading skills in electronic piano groups and vocal instructional groups? Answers to these questions should help to identify student variables that positively and negatively affect improvement of music-reading skills during group electronic piano or vocal instruction in general music classes. Ultimately, answers to these questions will define experiences which lead to developing music independence and literacy.

CHAPTER II

RELATED LITERATURE

Numerous music researchers have reported positive benefits of group piano instruction in general music classrooms (Curt, 1971; Martinez, 1976; Pace, 1967; Wig & Boyle, 1982). Among a few of the benefits reported are that piano instruction has improved harmonic and melodic concepts simultaneously and has increased students' understanding of music scale and interval patterns. Electronic piano technologies enable music educators to provide "hands-on" piano experiences for all students in large-group teaching environments. Several students may rehearse both individually or as part of an ensemble without disturbing classmates.

The primary question considered in this study is whether electronic piano instructional strategies increase middle school students' music reading skills. Some questions remain unanswered regarding group piano instruction. Can large groups of students (20 or more) within a general music class effectively develop music-reading skills through beginning piano instruction? Are there interactions between student variables (e.g., previous piano training) and instructional strategies (e.g., group electronic piano or vocal instruction) as related to developing selected music-reading skills? This study is focused on answering these questions.

Several sources of related literature and research findings guided this researcher during the planning and organization of the investigation. The discussion of this literature and research is divided into four general sections: (1) a general history of group piano instruction, (2) research on effects of group piano instruction on music learning, (3) application of learning theories to group piano instruction, and (4) physical and psychological development of preadolescent students.

Applications of Group-keyboard Instruction

Richards (1965) and Monsour (1963) investigated the historical use of group keyboard instruction in public schools. Group activities began in the United States as early as 1818. According to Richards, Calvin Bernard Cady was attributed the title "father of group piano instruction in the United States." Cady established a teaching philosophy for public school piano instruction by 1887. Cady believed that students should develop their abilities to express music ideas and to perform expressively on music instruments. Cady wrote that within small groups, students attained an understanding of music ideas and manifested those ideas at the keyboard. Students developed a group spirit which was helpful to individual learning.

Group piano classes gained considerable popularity in the early 1900's, according to Monsour (1963). Between 1915 and 1931 the class piano movement, which was sponsored by

private piano teachers and the piano industry, developed rapidly in many urban centers. As a result of financial support from the National Bureau for the Advancement of Music (NBAM, 1916), over 880 new communities and school districts included piano instruction in educational curricula. More than 3700 communities requested information from NBAM about how to initiate group piano instruction.

In 1926, a group of keyboard specialists began a piano section of the Music Supervisors National Conference (MSNC) for the purpose of developing class piano curricula and of using piano teaching assistants as classroom instructors. The MSNC Piano Section published a booklet entitled Guide for Conducting Piano Classes in the Public Schools (MSNC, 1926). The booklet was widely used and the original 20,000 copies were sold by 1929.

Both Richards (1965) and Monsour (1963) wrote about a partial decline of group piano instruction between 1930 and 1948. During adverse economic conditions of the Depression, some school systems employed private piano teachers to fill the role of trained classroom piano-specialists to provide individual piano lessons. There were additional factors influencing the decline in classroom piano instruction, including cost of instrument maintenance and piano specialist salaries. After the 1940's, the term "keyboard experience" was redefined as keyboard for functional use, namely, for locating pitches, applying music theories and composing.

During this time period, teachers did not focus on sight reading music literature.

Dachinger and Lawrence (1967) suggested that a deemphasis on sight reading skills in public school piano classes during the 1940's and 1950's was an instructional weakness. Dachinger and Lawrence also wrote that ". . . both teachers and parents were unaware that it was important to keep the student at the piano until he mastered sight reading, and other neglected skills, such as improvising, at least to a workable degree" (p. 31). These authors concluded that the lack of sight-reading emphasis in classroom piano instruction was a curricular weakness. As a result of determining some of the strengths and weaknesses of group piano instruction in public schools, the current study includes sight reading and applying music theory concepts within both electronic piano and vocal instruction.

Current Research on Class Piano Instruction

Jarvis and Robinson (1967) studied advantages of using group piano instruction in public schools and private studios. Some of the advantages these researchers reported are listed below.

1. Because the piano is a tuned instrument, the child does not encounter the problem of producing the correct pitch as he would with the string and wind instruments.
2. Melody and harmony can be experienced.
3. Although bells parallel the piano in many experiences, the piano offers a much wider range of pitch differences.

4. Since the tactile sense in young children is very strong, they often more readily grasp a concept intellectually when they feel the piano keys and hear the sounds simultaneously (p. 77).

There is evidence that classroom piano instruction increased students' interest in music and developed sight-reading skills. Wig and Boyle (1982) reported that upon completion of instruction, sixth graders, receiving group piano instruction, had significantly more positive attitudes toward music than sixth graders receiving group vocal instruction ($p < .001$). The piano-instruction group also scored significantly higher than the vocal-instruction group on the meter and major-minor mode discrimination subtests of Colwell's (1968) Music Achievement Test: Level II. Wig and Boyle (1982) reported that 75.2% of the piano-instruction group increased music reading skills during the first year of the study, but they found no significant effects of electronic keyboard instruction on pitch or rhythm scores ($p > .05$).

Finnell (1974) reported similar results for third, fourth, and fifth graders. Piano groups scored significantly higher than vocal groups on Colwell's (1970) Music Achievement Test: Level II and on Pace's (1976) Background Test for Classroom Music ($p < .005$). Finnell attributed some music achievement variations to piano background differences of the researcher and general music teachers. Some of the

teachers had different amounts of piano training producing a teacher behavior effect on results of the study.

Curt (1971) studied 763 seventh-graders. He reported that experimental piano students scored significantly higher than vocally trained students in all areas of musicality and cognitive associations included in Gaston's (1957) Test of Musicality ($p < .01$). The instructional treatments included materials organized by units of musical styles, such as Jazz and Romantic units of instruction. Curt attempted to relate instructional performance treatments to an understanding of music style and subject's music background. Curt reported that differences in teaching styles between the researcher and participating teachers may have confounding effects of "instructional treatment" on students' scores on the Test of Musicality. A teacher behavior effect confounded Finnell's (1974) and Curt's (1971) research findings. The researchers did not conclude with confidence that increased music achievement scores were solely attributable to group piano instruction. The current study controlled for possible effects of teacher behavior variations by using one teacher to administer both electronic piano and vocal instructional treatments.

Martinez (1976) studied effects of keyboard and vocal instruction on fifth graders' musical achievement. He found that keyboard subjects scored significantly higher than vocal subjects on Gordon's (1970) Iowa Tests of Musical Literacy:

Part I ($p < .05$). Martinez found no significant relationships between students' I.Q. scores and gains between pretest and posttest mean scores. Martinez concluded that subjects' entrance level behaviors, such as intelligence and pre-instructional music achievement, were not significantly related to subjects' posttest music achievement scores. He confirmed that subjects' posttest musical achievement scores reflected effects of piano and vocal instructional strategies.

Similar to the background questionnaire of Gaston's (1957) Test of Musicality, Dregalia (1983) constructed a test for measuring effects of various background variables on musical achievement scores. He reported that the three strongest variables considered in combination were music aptitude, number of years in ensembles, and presence of a piano in the home. These three combined predictor variables explained 44% of the variance in music achievement scores. Other significant predictor variables included private piano study, months of other instrumental study, and amount of practice time.

In a study conducted by Colwell and Rundell (1965), seventh-graders in selected classes received either group piano instruction, group ukulele instruction, or group voice instruction. During the first year, none of the groups scored significantly higher on aural-visual discrimination measures ($p > .05$). One year later however, the piano group

scored significantly higher on auditory-visual discrimination measures than either the ukulele or vocal groups ($p < .05$). These authors reported that factual knowledge did not improve within any group, except for those subjects who had studied piano privately outside of school time. The Knuth Tests of Musical Achievement (1966) were used to measure pitch and rhythm aural-visual discrimination retention after one year.

Silini (1977) compared effects of group piano instruction for adult subjects and for 7 and 8-year-old subjects on music-reading skills. The groups were instructed over a 15 week period, twice weekly. Subjects were encouraged to explore individually new repertoire. Both the younger and older groups learned from either Pace's (1967) Skills and Drills or Bastien's (1976) Beginning Piano for Adults. Silini (1977) presented complex sight-reading practice materials prior to requiring performance of similarly complex piano literature. Silini reported that both adults and younger subjects gained sight-reading proficiency and confidence in their musical abilities through electronic piano instruction. Both adults and younger beginners were motivated to continue their piano studies. Positive responses to beginning piano instruction were noted across several age groups.

Edelson (1977) investigated effects of electronic piano instruction on high-school subjects' music-reading skills. Electronic piano equipment used by Edelson included

electronic student pianos, headphones, and one master electronic piano with a keynote visualizer. A keynote visualizer is part of an electronic piano system which illuminates pitches on a grand staff as associated piano keys are depressed on the interfaced master unit. A similar system was used in this study. Edelson found that the keynote visualizer reduced the time required to develop music-reading skills for high-school subjects compared to developing music reading skills among high-school students studying piano privately.

There is evidence in the literature suggesting that group piano instruction may be effectively applied in general music classrooms. There is additional evidence suggesting that piano instruction also increases sight-reading skills across several age groups. Other researchers demonstrate that group piano instruction positively affect subjects' attitudes toward music across several age groups. Effects of prior piano experiences and instructional strategies on sixth graders' music reading skills, however, have not been clearly delineated.

Applications of Learning Theories

Montano (1982) used learning theories to support the efficacy of group piano instruction in school music programs. He related the group piano environment to learning theories supported by Dewey (1926). Dewey discussed effects of group environments and social learning conditions on students'

extrinsic motivation to learn. According to Montano (1982), group environments represented the social environment within which students learn and function efficiently. Montano reported on the effectiveness of group piano instruction for increasing subjects' intrinsic and extrinsic motivations for music learning. He hypothesised that peer group interaction, available in group piano instruction, was beneficial for developing music-reading abilities. He found that subjects' intellectual skills may be nurtured by peer group interactions. Students were motivated to share interpretative decisions as part of a group whereas they were not so motivated in a private piano lesson. The combined effect of group interaction and teacher input were more positive factors in a music learning environment than a teacher's input alone. Group piano instruction also produced an extrinsic motivation among students needing to belong to a group. Montano (1982) maintained that the environment of group piano instruction more appropriately encouraged group problem-solving than private piano lesson environment.

Erlings (1976) reported that group piano instruction benefited aesthetic growth, and thereby facilitated music independence. She reported that basic music concepts and problem-solving strategies were introduced more effectively in the group piano environment than in a private piano lesson. Students were able to accomplish a variety of activities in group piano classes, to perform a variety of

music literature, and to sight-read, transpose, and harmonize melodies in the group situation as opposed to the traditional private lesson activities which focuses on correcting performance mistakes. Students in group piano instruction formulated solutions to music problems by interacting with peers. Furthermore, peer interaction increased students' confidence and music appreciation.

Psychological and Physical Development of Pre-adolescents Relative to Music Reading Skills

Research has demonstrated that the learning behaviors of preadolescent students are different than learning behaviors of elementary age students (Alexander, Roodin, & Gorman, 1980; Bigner, 1983; Stone & Church, 1979). These researchers reported that variables such as sex, moodiness, anxious behavior, and responsibility were factors influencing the preadolescent's emotional states. In addition to psychological differences, preadolescent students demonstrated a rapid physical growth period when students experienced changing body sizes and sexual maturation. Girls entered into an accelerated growth change two years earlier than boys. Preadolescent students experienced a heightened concern with self-image, self-esteem, and identity. These children became concerned with many of the same problems facing adults, including responsibility, crime, violence and sexual drive.

Calssy (1985) showed that middle school students require music outlets for expressing their rapidly changing emotional states. In addition to emotional mood shifts, there was the physical problem of the changing male voice during this growth period. Swanson (1984) reported that boys' voices changed several times within a school year. Teachers found difficulty attributing a proper vocal type for males at this age because of the rapidly changing vocal apparatus. Lawrence (1980) reported, "Most startling were the cases where voices dropped in pitch suddenly as much as two octaves, and sometimes within the span of six weeks" (p. 49). In this period of rapidly changing male vocal apparatus, general music teachers found difficulty in placing males in appropriate bass, tenor or baritone groups. The addition of piano instruction during the sixth grades was proposed by Mark (1986) as a possible solution for encouraging males to participate in general music class activities.

Strahan and Toepfer (1984) discussed results of research on brain growth and thinking patterns of middle-school students. While not mentioning music classes directly, Strahan and Toepfer supported the need to include instruction in the middle-school program which develops activities that complement brain growth and development. They reported that creativity and imagination are important to a 'cross laterization' of the preadolescent brain activity. Middle-school teachers were encouraged to challenge middle-school

students to apply previous knowledge to new situations. These researchers wrote that students were not ready for new forms of thinking such as abstraction or logical reasoning, but middle-school students sought ways to reapply their previous learning strategies to new situations and thereby achieve success. Zimmerman (1986) also compared middle childhood learners with the adolescent learners:

> What begins as pleasure in 'playing' at making music in early childhood evolves into pleasure in craftsmanship and perfecting performance skills. . . . With the emergence of adolescence comes an increasing power of critical judgment. . . . Now the student confronts his musical future as he questions whether he wants to devote his time to serious music study or to pursue other possibilities among his many and wide-ranging interests. (p. 31)

Zimmerman reported that children (ages 8-11) were able to conserve the original shape of an object or idea before it was transformed according to theories of Piaget. Children in the preadolescent group were able to reverse this transformation and see the object in its original state. The researcher determined that preadolescent students needed opportunities to apply previous musical knowledge to new situations, and for developing musical concepts through problem-solving techniques.

The researcher for this study assumed that the applications of previous musical knowledge for the middle-school students might include sight-reading, composing, and improvising. Such activities should allow middle-school students to apply their previous music-reading skills to

performing, composing and improvizing. Electronic piano or vocal instruction might provide the general music teacher a means for applying acquired music-reading skills.

Summary of Research

There is evidence in the literature that middle-school students are in a physical and psychological growth period in which preferred emotional, intellectual, and social activities rapidly change. Boys in this age group are reluctant to sing because of their rapidly changing vocal apparatus. Sixth-grade students require opportunities to apply many of the skills acquired from previous grades including music-reading skills.

Middle-school students need a varied and flexible program to allow them to explore music in an active rather than passive environment. These students are more adept at learning from problem-solving activities with their peers than through teachers' lectures. Students need opportunities to share acquired skills with peers because of their extrinsic need to be accepted by a group.

Group support is essential at middle school age and should be fostered by the music teacher. Middle school learners benefit when asked to be a part of a music ensemble or a problem-solving group of peers. Positive relationships with peers are shown to exist in group piano classes whereas this outlet may not be available to them in other academic situations. Educators must be aware also of each student's

progress toward more abstract thinking patterns so the student can progress toward interpretation and stylistic applications within music performance situations. Increased reading ability is a means to increase expressive outlets.

The use of group piano in the classroom as a functional tool has been supported by studies that provide students with a reference device for locating pitches found within all orchestral registers. Keyboard familiarity also provides a visual "space-frame" or reference point for developing music-reading skills. Other researchers report strong relationships between prior piano study and music achievement; others report positive attitudes resulting from group instruction. Previous piano experience is a significant variable in early childhood music achievement, and seems to be important across several age groups for motivation to continue music studies.

General music class environments are related to middle-school students' attitudes and motivation toward participating in music. Preadolescent students frequently complete required music studies by the sixth or seventh grades and subsequently enroll in band, orchestra, or choruses as electives. Developing music-reading skills is an important goal for sixth grade band and choral programs. If music literacy is not developed by middle-school years, there is a probability that students will not continue music study.

The middle-school years seem to be critical for developing continuous musical involvement for life.

Statement of Purpose

The purpose of this study was to investigate the effects of group electronic piano instructional strategies on selected music-reading skills for sixth graders. Does group electronic piano instruction or vocal instruction develop aural-visual pitch and rhythm discrimination skills effectively? Does previous piano training affect students' development of selected music-reading skills within piano or vocal instructional treatment groups?

The independent variables considered in this study were instructional treatments (electronic piano instruction and vocal instruction), and prior piano experience. The researcher tested the following null hypotheses:

1. There is no significant effect of instructional treatment (electronic piano instruction and vocal instruction) on sixth-grade students' music-reading skills.
2. There is no significant effect of prior piano experience on sixth-grade students' music-reading skills.
3. There is no significant interaction effect of instructional treatment and prior piano experience on sixth-grade students' music-reading skills.

CHAPTER III

PROCEDURES

The specific purpose of this study was to investigate effects of electronic piano instruction and vocal instruction on selected music-reading skills of sixth-grade general music students. Both instructional treatments were administered simultaneously to three experimental classes (electronic piano instruction) and two control classes (vocal instruction) during a ten-week instructional period. All participating classes were taught by the same general music teacher. Effects of instructional treatments on music-reading skills were measured by the aural-visual pitch and rhythm discrimination subtest of Colwell's Music Achievement Test: Level II (1968). Effects of prior piano experience on music-reading skills also were examined.

Subjects

Sixth-grade students from the Winston-Salem/Forsyth School System served as subjects for this study. For the 1986-1987 academic year, there were approximately 8,225 middle-school students in the school system. Sixth-grade students (n=2700) were required to choose one music course from choral/general music, beginning strings, or beginning band. Approximately 1200 students chose choral/general music

during the 1986-1987 academic year. This research was conducted in one middle school which was selected randomly from a list of the 12 Winston-Salem/Forsyth Middle Schools. The middle school was a recently converted junior-high school in a rural community. The music faculty consisted of a part-time choral/general music teacher, a band teacher, and a strings teacher.

Sixth-grade students (n=107) selected choral/general music to fulfill the music requirement of the middle-school curriculum and served as subjects for this study. Subjects were assigned by the middle-school administration to five general music classes that met during the regularly scheduled academic periods. General music class sizes ranged from 11 to 26 students. The general music teacher randomly designated two classes as the control group (vocal instruction) and three classes as the experimental group (electronic piano instruction). There were 58 experimental subjects and 49 control subjects.

Using one middle-school general music program with one music teacher provided the researcher a control for confounding effects of varying behaviors across different teachers on subjects' music reading skills. The study's general music teacher's undergraduate music teacher education degree consisted of two major performance studies, including voice and piano. The researcher concluded that she was prepared by her undergraduate training to provide effective

vocal and piano instruction in the general music teaching-learning environment. She had taught part-time for two years in the middle school before participating in this study.

The general music classes, with the exception of one control class, met during the first three periods of each day (50-minute class periods). One control class met during the last period of the day (1:00-1:50). Subjects were not tracked into general music classes according to music achievement or aptitude. Subjects were assigned by homeroom groupings according to the planning periods of the language-arts, mathematics, and science teachers. Students were assigned to general music classes also by reading and mathematic groups during times these two academic classes were not meeting. Additionally, subjects' schedules were arranged so that general music classes alternated daily with physical education classes. General music classes met in the gymnasium. Jackson (1980) showed that students' music achievement was not affected negatively when electronic piano instruction was provided in groups larger than eight. The researcher assumed that class time of day may have affected results of the study. Effects of class size and class meeting times were examined to control for possible confounding effects on music reading skills. An analysis of variance was used to test for any significant effects of class size or meeting times on subjects' pretest scores.

Results of these analyses showed there were no significant differences among pretest scores between any two groups ($p > .05$).

Independent Variables

A quasi-experimental design was employed to test effects of electronic piano instruction and vocal instruction on subjects' music reading skills. Additionally, effects of prior piano experience on music reading skills was examined. There were two independent variables: instructional treatments (electronic piano and vocal instruction) and prior piano experience. Subjects who received less than one year of prior piano training were classified in the no-prior piano experience group. Effects of the variables were analyzed by a pretest and posttest statistical analysis of music-reading data.

Instructional Treatment

To facilitate an appropriate research plan and organization, the researcher conducted a preliminary study of the Winston-Salem/Forsyth Middle School System's sixth-grade general music program, including sequencing of instruction and scheduling. The general music teacher, participating in the current study, used the general music curriculum designed and accepted by the school systems' general music faculty. Music-reading instruction across the entire school system varied between middle schools. Common among all schools and general music programs in this system was that the music

teachers provided units of beginning instrumental music instruction in their general music classes. The middle-school system's general music curriculum instructed music teachers to offer sixth-grade students beginning instrumental instruction including electronic piano, bell chimes, guitar and voice. Music teachers introduced the instruments in the order they preferred, although the majority of teachers (75%) adhered to the study of one instrument per ten-week grading period.

The school administration supported a piano instructional unit by providing electronic pianos according to an alternating ten-week schedule. Additionally, the sixth grade was the final year of required music instruction, but students could choose between general music, band or string classes. Seventh-grade and eighth-grade students were given the option of continuing music study as an elective in choral and/or instrumental ensembles.

A primary goal of all sixth-grade general music teachers in this school system was to provide students with opportunities to develop music-reading skills through music performance with a variety of instruments, including electronic pianos, voice, bell chimes, and guitar. Middle-school music teachers assumed that units of instrumental study sufficiently motivated students to continue their music study. Music teachers also agreed that the development of music-reading skills helped to facilitate

students' continued music growth and participation in middle-school and high-school music programs.

As a part of the general music program, students also performed music learned during general music classes for winter and spring concerts and Parent-Teacher Association meetings. During the preparation of these performances, the present study's general music teacher stressed beginning instrumental music skills, music-reading, and theory skills and knowledge. Based on the results of this preliminary study of the Winston-Salem/Forsyth Middle School music curriculum, the researcher concluded that the selected middle school general music teacher and subjects were appropriate for testing effects of electronic piano and vocal instruction on selected music-reading skills.

Electronic Piano Instructional Treatment. During the 1984-1985 academic year, the Winston-Salem/Forsyth School System purchased six Musitronic MKS/4700 electronic piano units. In the current study, the general music teacher was assigned one electronic piano unit from September 1986 until February 1987. Each unit contained six 44-key pianos with six synthesized tonal variations per unit. Each piano unit contained six headphones for six individual student performers. The music teacher monitored individual performances by an interfaced control unit. The electronic piano switching network enabled the music teacher to monitor

any performance or combination of subjects' performances without disturbing other subjects.

In addition to the Musitronic electronic piano unit, the experimental general music class also was equipped with three Musitronic 44-key electronic pianos (Musitronic Model 101 V). A Wurlitzer Keynote-Visualizer (Model V-500) was available, which illuminated notes on an electronic grand staff display from notes depressed on an adjoining keyboard. Including one acoustical piano, there were ten pianos available in the gymnasium. There were one to two subjects at a piano during each piano class.

The gymnasium, in which general music was housed, was equipped with a chalkboard and an audio sound system, including a school model combined turntable, amplifier, and speaker system (Audio-Visual Model #2130). Instructional materials used in the experimental group included Beginning Piano of the Alfred Series (1981), and teacher-designed materials. Experimental electronic piano groups received no vocal instruction during the experiment. Electronic piano instruction lesson plans are presented in Appendix A. Lesson plans include objectives and descriptions of the electronic piano instructional treatment administered during this research.

Vocal Instructional Treatment. The vocal instructional treatment was administered during a ten-week period to the two control general music classes as the voice instructional

unit of the general music course schedule. During the treatment, the general music teacher emphasized reading of major and minor scales by scale-degree numbers, singing in parts, and sight-reading rhythm and pitch patterns containing some chromaticism. Control subjects indentified the pitch names and durations of notes included in the treble clef staff, counted rhythmic patterns according to beats and their subdivisions, and sang the tonic pitch of choral music being rehearsed. The control group received no piano instruction during the experiment. Vocal instruction lesson plans are presented in Appendix B. Lesson plans include objectives and descriptions of the vocal instructional treatment administered during this research.

Prior Piano Experience

As expected and previously indicated, subjects were assigned to general music classes according to neither music achievement nor music aptitude. Prior in-school and out-of-school music training was not used as a criterion to assign subjects to general music classes, including prior piano training. Because piano instruction was a primary focus of this study, the researcher assumed that prior piano training may interact with the effects of instructional treatments on subjects' music-reading skills. Effects of prior piano experiences on subjects' music-reading skills were examined. The prior piano experience variable was divided into two levels which included no piano training and

piano training. Subjects who had at least one year of piano instruction prior to the beginning of this experiment were classified as piano training subjects, while those who had less than one year of piano training were classified as no piano training subjects.

Measurement of Music Reading Skills

Effects of instructional treatments and prior piano experience on subjects' music reading skills were measured by the aural-visual pitch and rhythm discrimination subtest of Colwell's Music Achievement Test (MAT) (1968). The pitch and rhythm subtest was designed to measure subjects' abilities to detect discrepencies between aurally presented pitch or rhythm patterns while visually tracking the music notation of these patterns. The subtest was administered as a pretest and posttest prior to and after instructional treatments. Testing equipment and materials included the MAT recording of the pitch and rhythm subtest, answer sheets, and a scoring template. The subtest recording included instructions for taking the MAT and aural presentations of the subtest items. The MAT audio recording was presented aurally by an Audio-Visual school model self-contained turntable, amplifier, and speaker sound system (Model # 2130).

Subjects were instructed to listen to the test instructions and mark their answers with pencil as instructed. The general music teacher instructed subjects to

follow aurally the directions and procedures from the recording for indicating anwers on the answer sheet. Subjects were given an opportunity to ask questions about how to take the tests. The researcher scored subjects' pretest and posttest scores. Instructions presented to subjects and descriptions of both the aural-visual pitch and rhythm discrimination subtest (Colwell, 1968) are included in Appendix C.

Validity and Reliability

The rhythm and pitch aural-visual discrimination subtest of Colwell's MAT was selected for this study for several reasons: (1) high content and criterion-related validity, (2) high reliability, and (3) the author's test purpose and objectives. Content validity was established by Colwell (1968) from a consensus of primary music objectives collected from leading music educators. Colwell investigated current music basal textbooks to determine overall aims and objectives for general music instruction. The results of these findings were used to guide construction of the MAT test items (Colwell, 1968). The MAT was considered to be the most appropriate testing instrument for this study because it is perhaps the shortest available standardized testing instrument (35 minutes to complete) for measuring some of the more critical achievement areas for sixth-grade general music study, including music reading skills. The aural-visual

pitch and rhythm subtest required approximately twenty minutes to administer.

High criterion-related validity was established via numerous research studies. Lehman reported (Burris, 1984) that the MAT correlated highly with music teachers' reports of students' music achievement, especially in the sixth-grades (r = .92). The pitch and rhythm aural-visual discrimination subtest of the MAT was strongly correlated with music achievement tests such as Gordon's (1970) Iowa Tests of Musical Literacy (Young, 1976). Young also reported a moderate to strong correlation between teachers' ratings of students' reading abilities and the aural-visual discrimination subtests of the MAT (r = .76). Colwell reported a high reliability on test-retest measures of the MAT (r = .97).

Data Analysis

Subjects' test scores were classified as pitch and rhythm subtest scores, which also were summed to acquire a composite music-reading score for each subject. The maximum possible score for aural-visual pitch discrimination was 28 and the maximum possible score for aural-visual rhythm discrimination was 32, for a composite score of 60. The researcher used descriptive and inferential statistics to analyze data. Descriptive statistics were used to determine the central tendency of the music-reading scores by instructional treatments and prior piano experience. Pretest

and posttest scores were recorded for each subject. Measures of central tendency and variability also were used to identify the distributional characteristics of the pretest and posttest music-reading scores. The means, standard deviations, and analysis of covariance were determined by the Statistical Analysis Procedures (SAS, 1984).

Posttest composite, pitch and rhythm music-reading scores were classified by subjects across independent variables. Mean scores were analyzed by a 2 (instructional treatments) X 2 (prior piano experience) factorial analysis of covariance. The composite pretest score served as the covariate for the composite analysis. The pitch pretest served as the covariate for the pitch analysis, and the rhythm pretest served as the covariate for the rhythm analysis. A two-way ANCOVA adjusted subjects' composite mean scores for possible variance due to intact classes and subjects' entrance level music reading skills. A critical *F* value, significant at .05 level, was considered an appropriate alpha level for purposes of rejecting the null hypotheses.

CHAPTER IV

RESULTS

Introduction

Data were collected by administering the aural-visual pitch and rhythm discrimination subtest of Colwell's (1968) Music Achievement Test: Level II. To test the hypotheses of this study, subjects' pitch and rhythm scores were combined to form a composite music reading score. A secondary concern, however, was possible differences between subjects' aural-visual pitch and rhythm discrimination skills. Therefore, pitch and rhythm scores also were analyzed. Each subject received pretest and posttest composite, pitch and rhythm aural-visual discrimination scores which were operationally defined as measures of music reading skills. The maximum possible composite score was 60 (pitch score, 28 and rhythm score, 32). Descriptive and inferential statistics were used to analyze the data. Pretest scores were analyzed to determine entrance level music reading ability for prior and no-prior piano experience groups. Posttest scores were analyzed to determine effects of instructional treatments and prior piano experiences on subjects' music reading skills.

Analyses of Data

Pretest and posttest raw scores were classified by composite, pitch and rhythm scores (See Appendix D). Means

and standard deviations for pretest and posttest score distributions were calculated. Three 2 (instructional treatments) X 2 (prior piano experience) factorial analyses of covariance were used to analyze least squares mean composite, pitch and rhythm posttest scores. Pretest composite, pitch or rhythm mean scores served as the covariate respectively for each posttest analysis. Covariates were used to control for difference due to subjects' entrance level music reading skills, and to control for possible bias due to intact classes serving as subjects (Keppel, 1973; Wildt & Ahtola, 1978).

Wildt and Ahtola (1978) recommended the use of analysis of covariance to remove bias attributable to the experimental and control subjects not being matched on some important subject characteristic, and to increase the precision of the the experiment. In this study, the researcher found that the intact classes of subjects differed in music reading skills, and that this difference might influence their performances on the aural-visual pitch and rhythm discrimination tests. Therefore, subjects' mean scores were adjusted statistically for differences in subjects' pretest scores by the analyses of covariance procedures.

Descriptive Statistics

Means and standard deviations were calculated to describe pretest and posttest composite, pitch and rhythm scores. Table 1 presents the pretest and posttest mean scores and standard deviations by instructional treatment.

Table 1

Pretest and Posttest Means and Standard Deviations For Composite, Pitch and Rhythm Scores by Instructional Treatment

Treatment		Composite		Pitch		Rhythm	
	n	x	SD	x	SD	x	SD
Experimental							
Pretest	58	14.96	4.29	7.12	3.75	6.86	3.39
Posttest	58	17.19	5.08	7.86	3.59	8.50	2.90
Control							
Pretest	49	14.39	4.17	6.86	3.39	7.47	3.46
Posttest	49	13.27	4.17	6.90	2.95	6.35	3.69

Pretest composite, pitch and rhythm mean scores were similar for both experimental and control groups. The posttest mean composite and rhythm scores for both groups were notably different. The experimental group's posttest mean composite and rhythm scores were 2.23 and 1.64 points higher repectively than pretest scores. The control group's posttest composite and rhythm scores were 1.12 points lower than pretest scores. The experimental and control group's posttest pitch scores differed only by .96 points. Pitch scores were the only improved posttest score within the control group. Differences between experimental and control subjects' scores, in part, seemed attributable to the reduction of control subjects' posttest composite scores (-1.12 points) and rhythm scores (-1.12 points).

Table 2 includes pretest and posttest mean scores, and standard deviations by prior piano experience. Pretest scores showed that subjects with prior piano experience began the instructional period with higher music reading skills than no prior piano experience subjects.

Table 2

Pretest and Posttest Means and Standard Deviations For Composite, Pitch and Rhythm Scores by Prior Piano Experience

Treatment	n	Composite		Pitch		Rhythm	
		x	SD	x	SD	x	SD
Prior Piano Exp							
Pretest	39	16.57	4.39	6.03	3.55	8.56	3.49
Posttest	39	17.13	5.49	8.15	3.59	8.56	3.46
No Prior Piano Exp							
Pretest	68	11.79	4.01	5.84	3.05	6.13	2.49
Posttest	68	13.27	3.98	7.00	3.12	6.91	3.31

A comparison of prior piano experience and no prior piano experience groups showed that the highest and lowest difference between mean scores were .19 points (pitch scores) and 4.78 points (composite scores). Differences between means was reduced somewhat on the posttest composite and rhythm scores. The prior experience subjects' posttest mean pitch score (8.15) was more notably improved (+2.02 points) than the no prior piano experience subjects' posttest mean (7.00) pitch score (+1.16 points). Overall, the no prior piano experience subjects improved their posttest mean composite score (13.04) by 1.30 points more than the prior piano experience subjects'

posttest composite mean score (17.13), (+.567 points). Differences in prior experience and no prior experience mean scores indicated that the no prior experience group benefited more by instructional treatments than the prior experience group.

Pretest and posttest mean scores and standard deviations across instructional treatments and prior piano experience are presented in Table 3.

Table 3

Pretest and Posttest Means and Standard Deviations For Composite, Pitch and Rhythm Scores across Instructional Treatment and Prior Piano Experience

	Prior Piano Experience				No Prior Piano Experience			
	n	Composite	Pitch	Rhythm	n	Composite	Pitch	Rhythm
Experimental								
Pretest	15	17.46	10.00	7.46	43	12.46	6.11	6.43
		*(4.17)	(3.85)	(2.66)		(4.40)	(3.17)	(2.75)
Posttest	15	18.99	9.73	9.20	43	15.46	7.20	8.25
		(5.39)	(4.06)	(2.90)		(4.77)	(3.21)	(2.88)
Control								
Pretest	24	17.66	8.41	9.25	25	11.12	5.36	5.76
		(4.70)	(3.28)	(3.81)		(3.60)	(2.81)	(1.94)
Posttest	24	15.33	7.16	8.16	25	11.24	6.64	4.60
		(5.71)	(2.94)	(3.77)		(2.63)	(2.98)	(2.67)

* = Standard Deviations

Pretest Scores. Electronic piano groups and vocal groups were compared within the prior or no prior experience groupings. Pretest scores showed that subjects with prior piano experience from both treatment groups began the

instructional period with higher music reading scores than no prior piano experience groups.

Differences between pretest composite means were similar for experimental subjects (17.46) and for control subjects (17.66) with prior experience. More subjects in the control classes reported prior piano experience (24) than experimental subjects (15). Experimental subjects without piano experience scored 5.00 points less on the pretest composite mean score than experimental subjects with prior experience. Control subjects without prior piano experience scored 4.09 points less on the composite mean pretest score than control subjects with prior experience.

Pretest pitch means were different between experimental subjects with prior piano experience and no prior experience (10.00 and 6.11 respectively). There was less difference on pitch mean scores between experimental instructional groups with prior experience than without prior experience (7.46 and 6,30) respectively. Control subjects pretest pitch scores were also different across prior and no prior experience (8.41 and 5.36) respectively. Differences in control group pretest rhythm means were also notably different across prior and no prior experience effects (9.25 and 5.76). At the beginning of the current study, pretest mean scores were higher for subjects with prior piano experience.

Posttest Scores. Differences between prior piano subjects' and no prior piano subjects' composite posttest mean

scores decreased for experimental groups and increased for control subjects (See Table 3). Vocal groups with prior piano experience gained less on composite mean scores than control subjects without prior experience. Experimental groups without prior piano experience increased posttest composite mean (15.46) by 3.00 points, their pitch mean (7.20) by 1.09 points, and their rhythm mean (8.25) by 1.82 points. Control groups without prior piano increased composite and pitch posttest scores slightly but decreased the rhythm posttest mean (4.60) by 1.16 points. In contrast, experimental subjects' posttest rhythm mean (9.20) was positively affected by prior experience (+1.86 points). The effect of instructional treatment on composite, pitch and rhythm aural-visual discrimination scores was greater than the effect of prior piano experience on these scores. The only group of subjects improving composite, pitch and rhythm mean scores were experimental groups without prior piano experience. While both treatment groups improved posttest scores, the experimental groups without prior experience improved most consistently.

Greater differences were noted between treatment group mean scores than for prior and no prior experience group posttest mean scores. Experimental treatment groups with prior piano experience and without prior piano experience improved posttest composite mean scores by 1.53 and 3.00 respectively. Control groups with prior piano experience

scored less (-2.33 points) on composite means. Control groups without prior experience improved posttest composite mean scores by .12 points. Both experimental and control subjects with prior experience scored less on posttest pitch mean scores (-.26 and -1.38 points) than pretest pitch scores. Apparently, neither beginning electronic piano nor vocal instruction positively affected prior piano experience subjects' pitch reading scores. Only those subjects without prior experience improved composite and pitch mean scores. To test the effects of instructional treatment and prior experience on subjects' music reading scores, an analysis of covariance was employed.

Analysis of Covariance

A two-way (2 X 2) analysis of covariance (ANCOVA) was used to test the null hypotheses. A critical F value was established at a significance level of $p = .05$. Posttest composite scores were grouped by instructional treatment and prior piano experience. Pretest composite mean scores served as the covariate, thereby controlling for differences due to entrance level music reading skills. Composite mean scores were adjusted to least squares mean scores. The least squares mean scores procedure adjusted for possible effects of the covariate (pretest composite scores) on the posttest mean scores. Least squares mean scores were calculated across instructional treatments and prior piano experience.

Within each instructional treatment group, least squares mean scores were somewhat different, suggesting that prior piano experience affected improvement of music reading skills. The difference between least squares mean scores, however, was seen most notably between instructional treatments. The analysis of least squares mean scores supported the premise that instructional treatment contributed to improvements of subjects' music reading skills (See Table 4).

Table 4

Least Squares Composite Means Across Instructional Treatment and Prior Experience

	Prior Piano Experience	No Prior Experience
Control	13.89	12.39
Experimental	17.57	16.08

The analysis of covariance of composite scores (See Table 5) showed that the combined main effects of instructional treatments and prior piano experience on music reading skills was significant (p = .0001). The significance of the main effects was primarily attributable to the instructional treatment effect.

The effect of instructional treatment on sixth grade subjects' music reading skills was highly significant (p = .0001). The least squares mean score for the experimental group was 16.82 and for the control group, 13.14. As was

noted (See Table 1), the pretest and posttest composite mean scores for the control group were 14.39 and 13.27 respectively; and for the experimental group, 14.96 and 17.19. The difference between the two treatment groups' least squares mean score was 3.68 points. The electronic piano treatment improved subjects' music reading skills significantly more than the vocal instructional treatment improved composite aural-visual discrimination scores. The null hypothesis that there is no effect of instructional treatment on sixth grade students' music reading skills was rejected.

Table 5

Treatment (2) X Prior Piano Experience (2) Analysis of Covariance on Composite Scores with Pretest Composite Scores Serving as the Covariate

Source	df	SS	MS	F	p
Covariate					
Pretest Covariate	1	296.04	296.04	15.22	.0001
Main Effects	4	893.06	223.26	11.48	.0001
Instructional Treatment	1	315.34	315.34	16.22	.0001
Prior Piano Experience	1	36.60	36.60	1.88	.1731
Interaction Effect					
Treatment-Piano Experience	1	0.00	0.00	0.00	.9948
Subjects within Treatment-Piano Experience	102	1983.24	19.45		
Corrected Total	106	2876.54			

The effect of prior piano experience on sixth grade subjects' music reading skills was not significant (p =.1731).

The least squares mean scores for the prior experience group was 15.72 and for the no prior piano experience group, 14.24. Table 1 shows that pretest and posttest composite mean score difference for the prior piano experience group was 1.56. Table 4 shows a greater difference between experimental electronic piano instruction and vocal instruction by least square means analysis (3.69 points for the prior experience group and 3.69 for the no prior experience groups). The null hypothesis that there is no effect of prior piano experience on sixth grade students' music reading skills was retained.

The interaction effect between instructional treatment and prior piano experience was not significant (p = .9948). The least squares mean scores for no prior piano subjects across instructional treatments were 12.39 and 16.08 with a difference between means of 3.69. The least squares mean score for prior piano subjects across instructional treatments was 13.89 and 17.56, with a difference between means of 3.69. Least squares mean comparisons showed that the significance of the main effects was attributable to the instructional treatment rather than to prior piano experience or an interaction between independent variables. The null hypotheses that there is no significant interaction effect of instructional treatment and prior piano experience on sixth grade students' music reading skills was retained.

Of secondary concern to the researcher was an investigation of the effects of instructional treatment and

prior piano experience on aural-visual pitch and rhythm discrimination as independently associated with sixth grade subjects' music reading skills. To analyze and examine this secondary concern, two-way analyses of covariance were conducted on pitch scores and rhythm scores with pretest pitch and rhythm scores respectively serving as the covariate. Results of these analyses appear in Tables 6, 7, 8, and 9.

Table 6

Least Squares Mean Pitch Scores across Instructional Treatment and Prior Piano Experience

	Prior Piano Experience	No Prior Piano Experience
Experimental	9.46	7.29
Control	7.04	6.79

An analysis of covariance of the pitch scores indicated that the significance of the main effects (p = .0424) was attributable to the instructional treatment effect (See Table 6). The least squares mean pitch score for the experimental group was 8.38 and for the control group, 6.91.

Within each instructional treatment, least squares mean pitch scores were greater than for prior experience groups. The difference between least squares mean pitch scores was most notable between instructional treatments (+2.42 points higher for experimental treatment than +.50 points higher for control treatment). The analysis of least squares mean scores

supported the premise that electronic piano instruction affected subjects' pitch reading scores more than vocal instruction.

Table 7

Least Squares Mean Pitch Scores across Instructional Treatment and Prior Piano Experience

Source	df	SS	MS	F	p
Covariate					
Pretest Pitch	1	8.71	8.71	0.83	.3640
Main Effects	4	107.64	24.91	2.57	.0424
Instructional Treatment	1	48.41	48.41	4.26	.0339
Prior Piano Experience	1	27.14	27.14	2.59	.1106
Interaction Effect					
Treatment X Prior Experience	1	21.47	21.47	2.05	.1553
Subjects within Treatment X Prior Piano Experience	102	1068.44	10.48		
Corrected Total	106	1176.05			

Instructional treatment significantly affected subjects' aural-visual pitch discrimination scores ($p = .0339$). The effect of prior piano experience on pitch reading scores was not significant ($p = .1106$). The interaction effect of instructional treatment and prior piano experience on pitch reading skills was not significant ($p = .1553$). Least squares mean pitch score differences were greater between treatment groups than between prior piano experience groups. Least

squares mean comparisons showed that the significance of the main effects was attributable to the instructional treatment rather than to any interaction of treatment and prior experience variables.

Table 8

Least Squares Mean Rhythm Scores across Instructional Treatment and Prior Experience

	Prior Piano Experience	No Prior Piano Experience
Experiemental	9.08	8.43
Control	7.59	4.92

Results of the least square means analysis showed that within instructional treatment groupings, the least squares mean rhythm scores were considerably different across prior experience and no prior experience groups. Experimental subjects' least squares rhythm mean score was .635 points greater for prior experience groups than for no prior experience groups. Control subjects' least square mean rhythm score differed 2.66 points across prior experience categories. The effect of prior piano experience was notably greater than no prior experience on the control group's least square mean rhythm score. Across instructional treatment, least squares mean rhythm scores were notably different between the experimental treatment group with no prior experience and the control group with no prior experience (4.50 points greater for experimental treatment). Expermental subjects with prior

experience improved their posttest rhythm mean score (9.20) by 1.86 points (See Table 3). Instructional treatment and prior piano experience significantly affected subjects' rhythm reading scores (See Table 9).

Table 9

Treatment (2) X Prior Piano Experience (2) Analysis of Covariance on Rhythm Scores with Pretest Composite Scores Serving as the Covariate

Source	df	SS	MS	F	p
Covariate					
Pretest Rhythm	1	56.46	56.46	6.32	.0135
Main Effects	4	345.27	86.32	9.66	.0001
Instructional Treatment	1	144.16	144.16	16.13	.0001
Prior Piano Experience	1	56.01	56.01	6.27	.0139
Interaction Effect					
Treatment X Prior Piano Experience	1	22.65	22.65	2.53	.1145
Subjects within treatment X Piano Experience	102	911.46	8.94		
Corrected Total	106	1256.73			

The analysis of covariance of the rhythm scores showed that the significance of the main effect was attributable to both instructional treatment and prior piano experience. The effect of instructional treatment on sixth grade rhythm reading was significant ($p = .0001$). The effect of prior piano experience on sixth grade rhythm reading also was

significant (p = .0139). Instructional treatment had the greatest effect on sixth grade subjects rhythm reading skills; however, prior piano experience also had a significant effect on rhythm reading skills. A comparison of the means indicated control subjects' least squares mean rhythm score were 4.50 points less than experimental subjects' least squares rhythm score. Control subjects with prior piano experience improved rhythm reading scores more than control subjects without prior piano experience. Prior piano experience influenced subjects' aural-visual rhythm discrimination scores regardless of instruction.

The interaction effect between instructional treatment and prior piano experience was not significant (p = .1145). The significance of the main effects was attributable to both instructional treatment and prior piano experience. The significance of the prior piano experience effect on rhythm reading skills was attributable to the difference between the prior and no prior piano experience grouping within the control group. The least squares mean rhythm scores for experimental groups with prior and no prior experience differed slightly (.635 points). The least squares mean rhythm scores for control groups with prior and no prior experience differed considerably (+2.67). Subjects with prior piano experience began the instructional period of the current study with greater rhythm pretest scores, and continued to

improve rhythm reading more than subjects without prior piano experience.

Summary of Results

An intial investigation of raw scores indicated that subjects from both experimental and control treatment groups improved their posttest scores. Posttest composite (pitch and rhythm) mean scores were analyzed within instrcutional treatment and prior piano experience groups. An investigation of the pretest and posttest composite, pitch and rhythm mean scores indicated that experimental subjects gained on composite and rhythm posttest scores while control subjects gained on pitch posttest mean scores. The only group improving on all three posttest mean scores was the experimental group without prior piano experience. The conclusion was that electronic piano instruction enhanced sixth grade subjects' music reading skills who had no prior piano experience.

An analysis of covariance of the composite scores showed that the significance of the main effect were attributable to instructional treatment ($p = .0001$). Prior piano experience did not significantly affect composite nor pitch reading scores. However, the prior piano experience variable significantly affected ($p = .0139$) rhythm reading scores. No significant interactions between instructional treatment and prior piano experience variables occurred for any of the analyses of covariance. Analysis of data showed that

electronic piano instruction significantly affected music reading skills, particularly for subjects with no prior experience.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to examine effects of electronic piano instruction on music-reading skills for sixth grade students in middle schools. Electronic piano instruction and vocal instruction were compared to determine the effectiveness of both strategies for improving music-reading skills. A related concern was the effect of prior piano experience on music-reading skills. For this study, music-reading was defined operationally as subjects' ability to discriminate between the accuracy of written music notation as compared to an aural presentation of the music notation. Music-reading skills selected for this study included pitch and rhythm aural-visual discrimination skills as measured by Colwell's (1968) Music Achievement Test (MAT).

Researchers reported problems associated with teaching music-reading to middle-school students (Caissy, 1985; Lawrence, 1980). Among the problems was a reluctance of male subjects to sing because of their changing voices. Middle-school students frequently sought peer approval rather than teacher approval to support their self-esteem. Researchers also reported that middle school students were in a mental growth period as they made a transition from concrete stages into formal thinking and learning levels

(Strahan & Toepfer, 1984). Students required an environment for refining performance skills and opportunities to apply previously learned music concepts to new situations (Caissy, 1985). Other researchers wrote that music-reading was related to increasing music independence and motivation for continuing music studies further (Dachinger & Lawrence, 1967). The focus of the current study was on the effectiveness of electronic piano instruction and vocal instruction on improving music reading skills during a critical time of growth and development for middle school students.

Data were collected from 107 sixth-grade subjects assigned to two groups: electronic piano instruction (n=58) and vocal instruction (n=49). There were three experimental classes (electronic piano instruction) and two control classes (vocal instruction). Subjects were pretested and posttested by the aural-visual pitch and rhythm discrimination subtest of Colwell's (1968) MAT II. Pitch and rhythm scores were summed to form a composite reading score, as indicated by the scoring instructions of the Colwell test. This composite score was defined operationally as a measure of subjects' music-reading skills. Subjects received ten weeks of instructional treatment between the pretest and posttest. Pretest and posttest scores were grouped by instructional treatment and by prior piano experience as two independent variables. Within these groupings, subjects'

posttest mean scores and standard deviations were analyzed. A 2 (instructional treatment) X 2 (prior piano experience) analysis of covariance (ANCOVA) was employed to analyze the posttest reading scores. Pretest music-reading scores served as the covariate due to initial differences between subjects pretest scores as a result of intact class assignment.

Results of Treatment

An analysis of posttest mean scores showed that the experimental treatment group composite, pitch, and rhythm mean scores were greater (17.19, 7.86, and 8.50) than the control treatment group's composite, pitch, and rhythm mean scores (13.27, 6.90, and 6.35). Experimental subjects without prior piano experience improved on all posttest mean scores (composite, pitch and rhythm). Control groups without prior piano experience slightly improved composite and pitch posttest mean scores (11.24. +.12 and 6.64, +1.28). The most consistent improvement on posttest mean scores were by experimental subjects without prior piano experience. Instructional treatment appeared to affect subjects' posttest scores more than the effect of prior piano experience.

An analysis of covariance was employed to determine the significance of the effects of instructional treatment, prior piano experience, and the interaction of these variables on composite music-reading skills. The null hypothesis that there is no significant effect of instructional treatment on sixth-grade students'

music-reading scores was rejected ($p < .0001$). Effects of prior piano experience and interaction between instructional treatment and prior piano experience were not significant ($p = .1731$) and ($p = .9948$). A least squares analysis of the composite mean score showed that the experimental electronic piano music-reading mean was higher (16.87) than the control vocal music reading mean (13.14). The null hypothesis that there is no significant effect of instructional treatment (electronic piano instruction and vocal instruction) on sixth-grade students' music-reading skills was rejected. Electronic piano instruction was highly beneficial to sixth-grade students' music-reading skills.

Only a slight difference was noted between subjects least squares mean scores with prior piano experience and no prior piano experience (15.73 and 14.23). The null hypothesis that there is no significant effect of prior piano experience on sixth-grade students' music-reading skills was retained. The null hypothesis that there is no significant interaction effect of treatment and prior piano experience on sixth-grade students' music-reading skills also was retained. Even though subjects with prior piano experience improved posttest rhythm scores compared to experimental subjects improving without prior piano experience, the amount of music-reading skill improvement was greater for electronic piano subjects without prior piano experience. Middle-school

students' music-reading scores improved more as a result of electronic piano instruction than vocal instruction.

Implications of the Study to Music Education

Results of this study demonstrated the following:

1. Electronic piano instruction significantly increased subjects' reading skills, regardless of prior piano experience. An instructional period of at least ten weeks is recommended for providing electronic piano strategies within the general music curriculum in middle schools.

2. Beginning electronic piano instruction was not as beneficial to students with prior piano experience as to students without prior piano experience. Students with prior experience required either advanced group piano strategies or other types of instruction for improving their reading scores at the same rate as beginning electronic piano students.

3. Students in vocal and electronic piano groups improved music-reading scores. Even though the type of instruction affects music-reading improvement, students improved regardless of instructional treatment. Some students were motivated to improve their music-reading scores regardless of instruction. Intrinsic and extrinsic motivations were critical factors for sixth-grade students' improving music-reading skills.

Researchers have reported that group piano instruction is beneficial for improving music-reading, composition, and

improvisation skills (Mark, 1986; Pace, 1967). This study supports research which indicates that group piano instruction improves subjects' music-reading skills (Finnell, 1974; Martinez, 1976). The current study contradicts results of other researchers (Wig and Boyle, 1986) who found no significant effects of electronic piano instruction on sixth grade subjects aural-visual pitch and rhythm measures of Colwell's (1968) MAT II. In the Wig and Boyle study, two general music teachers provided instruction. Within the current study, only one teacher provided both experimental and control instructional treatments which provided an additional experimental control. The current study supported the premise (Montano, 1982) that students are extrinsically motivated in group piano classes to collaborate with peers for performing ensemble literature. Wig and Boyle (1982) found experimental electronic piano instruction increased subjects' intrinsic and extrinsic motivation for performing and reading music. This researcher corroborated these findings.

In a separate analysis of rhythm-reading improvement, the effect of prior piano experience was found to significantly (p = .0139) affect subjects' aural-visual rhythm discrimination score. A separate analysis of pitch reading skills yielded no significant effect of prior piano experience on subjects' pitch-reading skills (p = .1106). Effects of prior piano experience on the vocal group's pitch

reading skills were not significant. Evidence from these separate pitch and rhythm analyses suggests that prior piano experience more efficiently develops rhythm-reading skills as compared to pitch-reading skills. However, research is needed to explain why aural-visual rhythm discrimination skills are affected by prior piano experience and why prior piano experience had little effect on aural-visual pitch discrimination skills.

Recommendations for Further Study

Music-reading skills measurement in this study was the aural-visual pitch and rhythm discrimination subtest of Colwell's (1968) MAT II. Students were required to associate written music notation with an aural presentation of the music. Students were not required to read music by performing. Music educators need to study the relationships, if any, between music-reading by performing an instrument or singing and aural-visual discrimination skills. How does the combination of performance and aural-visual skills contribute to music-reading? Answering this question should help to clarify current definitions of music-reading and music literacy.

A need for further study is the identification of variables such as prior piano experience which influence music-rhythm-reading. What are the similarities, if any, between procedures for developing rhythm skills in general music classes and by group piano teachers? Identification of

these variables should suggest appropriate instructional procedures for improving music rhythm reading.

Vocal instruction in this study emphasized pitch-matching ability and interval recognition. An added instructional segment of group piano within vocal classes should also increase singers' ability to visualize interval distances and recognize pitches outside their vocal range. Researchers need to determine whether combining vocal and electronic piano instruction produces positive results for pitch or rhythm reading.

Electronic piano instruction significantly affected middle-school students' music-reading skills, especially for students without prior piano experience. Researchers need to identify appropriate instructional strategies for improving students' music-reading skills who have prior piano experience. An identification of appropriate instructional strategies should improve music-reading skills for groups with prior piano experience and increase their chances for music literacy. The most important result of this research was that a particular group improved composite, pitch, and rhythm scores. Electronic piano instruction benefited subjects without prior piano experience for composite, pitch and rhythm-reading measures. Electronic piano students and vocal students without prior experience improved their reading scores regardless of instructional treatment. The sixth-grade student's desire or interest to develop

music-reading skills is evident. Growth in music-reading ability depends upon the student's interest, motivation, and appropriate instructional treatment. Electronic piano instruction is recommended highly for middle school students because such instruction ultimately contributes to their music independence and literacy. When students demonstrate an interest in music-reading, the music teachers must determine appropriate instruction and challenge students to apply their previous music skills to new forms of performance and/or composition. Appropriate instructional treatment and motivation are primary prerequisites for facilitating music growth and continued music learning.

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APPENDIX A

Electronic Piano Instruction

APPENDIX A

Electronic Piano Instruction

The course outline for the electronic piano instruction is presented in Appendix A. Sources for this outline were compiled from the participating general music teacher's lesson plans and from notes taken from researcher observations. The instructional procedures described in this Appendix covered a ten-week instructional period.

Materials

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Teacher (Non-published). Individual performance packet (IPL). (Outline of Alfred Series, pages 1-46. Students were instructed to write in letter names of pitches, rhythmic numbers or perform music at the piano before advancing to next page).

Procedures for every class included one or all of the following activities: (1) Count aloud all rhythmic units and name pitches by letter name found in composition before performing at the piano; (2) Write in letter names or rhythmic units as instructed in the Individual Learning Packet; (3) Write in corresponding pitch or rhythmic units as instructed in the Note Speller while waiting turn to perform at the piano. Written work comprised one-third of the class and performing at the piano comprised the other two-thirds of class time. Students completing other class assignments would either continue in the method book, rehearse the Technic Book by Bastien, or perform duets with other class members.

Week I

Objectives:

1. Demonstrate proper body alignment with piano.
2. Demonstrate locating three black keys and two black keys in every register of piano.
3. Demonstrate directions of pitch movement: either up or down.

Procedures

1. Students individually demonstrated proper body alignment at the piano with hands, feet and elbows as described on p.3 of the Alfred Book.
2. Rehearsed fingering numbers of each hand. Students held up correct finger as requested (p. 4).
3. Students demonstrated directions of high and low pitches as described on p. 6.
4. Students located all three black note key arrangements in every register.

Week II.

Objectives:

1. Construct a cardboard keyboard.
2. Demonstrate corresponding number for fingers of both hands.
3. Play and sing finger numbers of each hand to show directions of pitches.

Procedures:

1. Each student constructed a facsimile of a piano by drawing a two-octave piano on construction paper, cutting out the drawing and placing the drawing in the Individual Learning Packet for later use. These drawings were used to prepare literature before performing at the pianos.
2. Students located all two black key note arrangements for each register of the piano.
3. Students held up correct finger corresponding to number requested by the teacher.

Week III.

Objectives:

1. Identify pitches as space or line notes (Notespeller, p. 4).
2. Locate all two and three black key note arrangements in each register.
3. Perform pages 8 & 9 (Alfred).

Procedures:

1. Students discussed differences in space notes and line notes corresponding to the grand staff.
2. Students counted all rhythms contained in pages 8 & 9 (Alfred).
3. Students performed Right and Left and Half Note.

Week IV.

Objectives:

1. Demonstrate quarter, half and whole note rhythmic units.
2. Demonstrate proper hand position and finger alignment for pages 10-11 (Alfred).
3. Perform Merrily We Roll Along, and O'er the Deep

Blue Sea.
4. Write in number of line or space notes (Notespeller, p. 6-7, Bastien).

Procedures:
1. Students located hand positions for literature (Alfred, p. 10 & 11) corresponding to picture.
2. Students counted aloud all rhythms for literature (Alfred, p. 10 & 11).
3. Students performed Merrily We Roll Along and O'er the Deep Blue Sea while naming each pitch by fingering number.
4. Students completed lessons 2 and 3 from (Bastien, Notespeller).

Week V.

Objectives:
1. Demonstrate five-finger hand positions.
2. Name pitches in treble clef.
3. Perform Hand-bells, and Jolly Old Saint Nicholas.
4. Complete Ipl to page 15 (Alfred).

Procedures:
1. Students individually located all pitches on Key-note visualizer for literature (Alfred, p. 12-15).
2. Students performed Hand-bells twice, the first time counting all rhythms aloud and the second time, performing while singing finger numbers corresponding to pitches.
3. Each student performed Jolly Old Saint Nicholas while the teacher performed the duet part.
4. Each student completed lessons 8, 9, and 10 of Notespeller (Bastien, p. 11-14).

Week VI.

Objectives:
1. Identify all letter names corresponding to pitch names for each register of the piano.
2. Locate white key letter names by touching two or three black key arrangements.
3. Demonstrate hand positions, counting aloud quarter note, half note and whole note rhythmic units.
4. Count within a time signature.
5. Identify bass clef notes.

Procedures:
1. Wrote in letter names as instructed in Notespeller (p. 16-19).
2. Located five-finger positions according to picture on p. 16 (Alfred).
3. Located all letter name pitches, (A through G) in relation to two or three black key arrangements in each register.
4. Performed Batter Up (Alfred, p. 29). Students counted

aloud all rhythmic units corresponding to beat number within each measure.

Week VII.

Objectives:
1. Count aloud dotted half notes.
2. Identify leger line notes outside of bass clef.
3. Perform My Clever Pup, The Zoo, and Playing in a New Position (Alfred, p. 20-23).
4. Write letter names of pitches in both treble and bass clefs (Bastien, p. 20-22).

Procedures:
1. Students counted aloud Sailing and Skating (Alfred, p. 24-25).
2. By positioning right-hand and left-hand thumbs on middle C, students performed The Zoo and My Clever Pup.
3. Students located five-finger position on C in both hands and performed Playing in a New Position (Alfred, p. 23).
4. Wrote in letter names of pitches in treble and bass clefs (Notespeller, p. 20-22).

Week VIII.

Objectives:
1. Construct individual note cards.
2. Complete Lesson 20 of Notespeller as instructed (Bastien, p. 23).
3. Perform Sailing and Skating (Alfred, p. 24-25).

Procedures:
1. Students drew five sets of grand staffs and place one pitch in the treble clef and one in the bass clef.
2. Students located middle C (C3) and positioned right hand on each subsequent white key (C, D, E, F, G).
3. Students counted Sailing and Skating before performing these at the piano. The teacher performed the duet part with students who performed these.
4. Students completed Lesson 20 of Notespeller as instructed (Bastien, p. 23).

Week IX.

Objectives:
1. Identify line or space notes (Alfred, p. 27).
2. Perform Rain, Rain! and A Happy Song (Alfred, p. 29 and 31).
3. Locate notes on grand staff (Alfred, p. 32).
4. Identify Sharps, flats and natural symbols.

Procedures:
1. Students marked appropriate line or space note as instructed (Alfred, p.27).
2. Each student performed Rain, Rain! and A Happy Song while

teacher performed corresponding duet part.
3. Each student named all pitches by letter names contained on page 32 (Alfred).
4. Students completed Lessons 21 & 22 of the Notespeller (Bastien, p. 24 & 25).

Week X.

Objectives:
1. Locate intervals of a second, third, fourth by both hands.
2. Perform Balloons, Who's on Third?, and July the Fourth!
3. Sight read Just a Second, Mexican Hat Dance and Rock Song.

Procedures:
1. Students located interval distances by finger number. Interval distances going up were measured by right hand finger numbers and intervals going down were measure by the left hand finger numbers.
2. Students performed one piano piece (See objective 2) while either the teacher or a more advanced student performed the corresponding duet part.
3. Each student also sight read a piano piece (See objective 3).
4. Students completed written work for their Individual Learning Packets.

APPENDIX B

Vocal Instruction

Appendix B

Vocal Instruction

This outline was compiled from the participating teacher's class planning notes and notes taken by the researcher from class observations. The purpose of this outline is to inform the reader of a ten-week instructional period of study for developing vocal music reading skills.

Procedures for each class included preparatory exercises for singing. These exercises included singing by specified intervals, both up and down, and by major or minor scale degrees. Students sang arpeggiated root position triads in five or six keys. The range of these exercises included tones within an octave. Students also sang chromatic scales in both directions. Boys and girls were asked to sing in registers corresponding to their voice type. The teacher determined voice type at the beginning of the academic period. In this study, part-singing was required for the students in the general music program. Students were graded according to participation in class, completion of assigned written work and participation in performances.

After fifteen minutes of preparatory "warm-up" exercises, students sight-read, discussed the directions and distances of the intervals, and performed a different vocal composition each week. For each vocal composition, students sight-read the rhythm and words, sang intervals by scale degrees within appropriate vocal ranges and then performed the composition. Sight reading included singing rhythms, scales and intervals as demonstrated on a chalkboard and teacher prepared materials. At least forty minutes of each fifty minute class period was devoted to sight-reading.

Materials

Crocker, E. (1986). Jubilate Deo. New York: Jensen Publications, Inc.

Dobbins, B. (1984). Basketball! (A Court Jest). Chapel-Hill, North Carolina: Hinshaw Music Co., Inc.

Gray, M. A. (1979). Boatmen Stomp (From The First Set of "New Songs to Old Words". New York: G. Schirmer, Inc.

Leontovich, M. (1983). Carol of the Bells (Arranged by Clarice Knight). Conway, Arkansas: Cambiata Press.

Marks, J. (1977). Rudolph the Red-Nosed Reindeer (Arranged by Ed Lojeski). New York: Nicholas Music, Inc.

Spevacek, L. (1984). Shenandoah (Arranged by Linda Stein Spevacek). New York: Jenson Publications, Inc.

Week I

Objectives:
1. Demonstrate quarter, half, whole, dotted-half and dotted-quarter note rhythmic units.
2. Demonstrate use of the "tie."
3. Locate intervals of a fourth, fifth, and sixth.

Procedures:
1. Students counted aloud quarter, half, whole, dotted-half and dotted quarter note rhythmic units in Shenandoah.
2. Dotted half and quarter notes were written on chalkboard. Students clapped the extended values of tied notes and dotted notes.
3. Students sang intervals of fourths, fifths and sixths by connecting intermitent scale degrees until each interval was sung easily.
4. Performed Shenandoah.

Week II.

Objectives:
1. Demonstrate even eighth and sixteenth rhythmic units.
2. Demonstrate dotted eighth and sixteenth note rhtyhms.
3. Locate pitches in Boatmen Stomp! and form scale from those pitches.

Procedures:
1. Students counted eighth notes as "one two, one two, one two", and sixteenth notes as "one two three four, one two three, four" within a predetermined quarter note tempo.
2. Students counted dotted sixteenth notes as "one hold hold note" (clapping on the words "one and note").
3. Students rehearsed eighth notes, sixteenth note and dotted eigths and dotted sixteenth rhythmic units in Boatmen Stomp!.

Week III

Objectives:
1. Demonstrate counting eighth and sixteenth rhythmic units.
2. Demonstrate saying words with constant pulse maintained.
3. Demonstrate metric accent.

Procedures:
1. Teacher reviewed numbering system for counting even sixteenth rhythmic units and introduced Basketball with this numbering system.
2. Students read words within a maintained pulse.
3. Students rehearsed half of Basketball with and without metric accents.

Week IV.

Objectives:
1. Perform Boatmen.
2. Demonstrate difference in numbered counting of triplets and sixteenth rhythmic units.
3. Demonstrate differences in triplets and sixteenth rhythms by consecutive alternating between the rhythmic units.

Procedures:
1. Students counted sixteenth rhythms aloud in Boatmen.
2. Students sang major scales for one octave in triplet and sixteenth note units.
3. Students finished Basketball!.

Week V.

Objectives:
1. Demonstrate intervals of octaves and minor sevenths.
2. Sing major or minor thirds.
3. Sing all scale degrees in numbers in both directions within established keys of D and E major.

Procedures:
1. Sang octave and minor seventh intervals as shown on chalkboard.
2. Sang major and minor thirds in both directions. Teacher would sing upper note while students sang lower member of the interval.
3. Sang D and E major scales by numbers of the scale degrees.

Week VI.

Objectives:
1. Demonstrate accenting for syncopations.
2. Sing arpeggiated major chords (scale degrees, root, third, fifth, minor seventh and octave).
3. Perform Jubilate Deo.

Procedures:
1. Groups of students counted eighth note rhythmic units evenly while another group counted only the second eighth note rhythms simultaneously for feeling music syncopation.
2. Groups of singers sang and held root, third, fifth, minor seventh or octave according to assigned chord member. This exercise employed several root tonal centers.
3. Students sight-read Jubilate Deo.

Week VII.

Objectives:
1. Perform Jubilate Deo.
2. Sing major and minor thirds downward.
3. Sing fourths and fifths ascending.

1. Students prepared words and music for Jubilate Deo.
2. Students sang major and minor thirds downward using the major or minor triad as a reference.
3. Students sang fourths and fifths ascending from a pre-determined note.

Week VIII.

Objectives:
1. Sing a minor scale down from the eighth scale degree to the tonic.
2. Sing imitative rounds.
3. Perform a 3/4 composition.

Procedures:
1. Students rehearsed singing natural minor scales both up and down.
2. Practiced rounds containing major and minor thirds.
3. Sight-read and learned Carol of the Bells.

Week IX.

Objectives:
1. Identify intervals and scales (either major or minor).
2. Demonstrate differences in simple and compound meters.
3. Demonstrate conducting in 4/4 and 6/4.

Procedures:
1. Students sang major and minor scales as indicated on a chalkboard.
2. Students rehearsed conducting 4/4, 3/4, and 6/4 time signatures.
3. Students rehearsed words and rhythms to Rudolph The Red-Nosed Reindeer.

Week X

Objectives:
1. Demonstrate differences in 2/2 and 4/4.
2. Sing and conduct simultaneously.
3. Demonstrate differences in parallel major and minor scales.

Procedures:
1. Students rehearsed singing major and minor scales consecutively from a given tone.
2. Students sang and conducted Rudolph the Red-Nosed Reindeer simultaneously.
3. Students sang and conducted three Christmas Carols: Silent Night, We Three Kings, and O Come, All Ye Faithful.

APPENDIX C

Scoring Directions for the Music Achievement Test II

APPENDIX C

Directions and Scoring Procedures for the Music Achievement Test: Level II (Part 3 - Auditory-Visual Discrimination) By Colwell (1968)

Directions for administering and scoring Part 3 of the Music Achievement Test: Level II are included in Colwell's (1968) Administrative and Scoring Manual (p. 14-16). Part 3 is divided into two subtests, pitch and rhythm. Directions for administering Part 3 are heard on a recording. The subject listens to directions from the recording and marks an answer sheet to indicate an answer. Twelve test items comprise the pitch subsection and twelve test items comprise the rhythm subsection. Each correctly marked answer is multiplied by 2 and all correct answers are totaled by this method. There are fourteen correct answers to the pitch subsection and sixteen correct answers to the rhythm subsection for a total composite score of sixty.

Directions are aurally provided by the recording. Subjects listen to recorded music corresponding to music notation provided on the answer sheet. The recorded music is performed correctly, but there are deviations in the written notation. The subject is asked to locate these deviations in the written notation compared to what is heard from the recording. The deviations in written notation are of two types: The music and notation move in contrasting directions or intervals in the notation are incorrect. The pitch subsections measures aural-visual acuity to direction and interval distance.

The rhythm subsection requires students to locate incorrectly notated rhythms compared to what is heard in the recording, and mark those corresponding measures on an answer sheet where these deviations occur. The proper number of beats for each measure is retained, but some of the written rhythmic units do not correspond to what is heard. Answer sheets are scored by the accompanying template which is provided with the test. This subsection requires ten minutes to complete. Both pitch and rhythm subtests require approximately twenty minutes to complete.

APPENDIX A

RAW SCORES

Appendix D

RAW SCORES

		Pretest			Posttest			
ID	Group	Pitch	Rhy	Comp.	Pitch	Rhy	Comp.	Prior Piano
1	Control	4	6	10	10	2	12	no
2	Control	8	8	16	8	8	16	yes
3	Control	4	2	6	6	4	10	no
4	Control	0	6	6	6	10	16	no
5	Control	12	10	22	4	6	10	yes
6	Control	10	8	18	4	0	4	no
7	Control	4	8	12	8	2	10	yes
8	Control	12	10	22	12	10	22	yes
9	Control	14	12	26	10	12	22	yes
10	Control	10	8	18	14	10	24	yes
11	Control	8	6	14	6	6	12	no
12	Control	4	6	10	10	4	14	no
13	Control	2	2	4	6	6	12	no
14	Control	4	8	12	6	4	10	no
15	Control	10	6	16	10	4	14	no
16	Control	2	6	8	2	8	10	no
17	Control	8	4	12	6	4	10	no
18	Control	10	4	14	14	0	14	no
19	Control	2	6	8	14	2	14	no
20	Control	6	8	14	8	2	10	no
21	Control	14	6	20	6	10	16	yes
22	Control	12	4	16	2	4	6	yes
23	Control	12	12	24	6	10	16	yes
24	Control	6	12	18	4	8	12	yes
25	Control	8	4	12	6	6	12	no
26	Control	8	4	12	6	4	10	no
27	Control	6	12	18	10	8	18	yes
28	Control	8	4	12	6	6	12	yes
29	Control	8	10	18	6	8	14	yes
30	Control	10	4	14	6	2	8	yes
31	Control	6	10	16	8	12	20	yes
32	Control	6	10	16	6	8	14	no
33	Control	4	4	8	4	6	10	yes
34	Control	6	6	12	4	6	10	no
35	Control	6	6	12	6	4	10	no
36	Control	6	6	12	6	4	10	yes
37	Control	4	4	8	8	2	10	no
38	Control	6	16	22	4	12	16	yes
39	Control	2	4	6	4	8	12	no
40	Control	12	12	24	10	14	24	yes
41	Control	8	16	24	10	14	24	yes
42	Control	6	6	12	6	8	14	no
43	Control	2	6	8	6	2	8	no
44	Control	6	6	12	6	6	12	yes

RAW SCORES (Continued)

		Pretest			Posttest			
ID	Group	Pitch	Rhy	Comp.	Pitch	Rhy	Comp.	Prior Piano
45	Control	8	6	14	4	8	12	yes
46	Control	2	16	18	8	2	10	yes
47	Control	6	8	14	4	4	8	no
48	Control	6	8	14	4	6	10	no
49	Control	8	10	18	10	14	24	yes
50	Experimental	2	4	6	10	10	20	no
51	Experimental	8	8	16	10	6	16	no
52	Experimental	10	6	16	6	10	16	no
53	Experimental	12	6	18	8	8	16	yes
54	Experimental	6	8	14	8	8	16	yes
55	Experimental	8	12	20	12	12	24	no
56	Experimental	4	4	8	0	8	8	no
57	Experimental	6	8	14	10	6	16	no
58	Experimental	10	6	16	18	12	30	no
59	Experimental	12	6	18	6	12	18	yes
60	Experimental	4	4	8	4	12	16	no
61	Experimental	4	6	10	6	4	10	no
62	Experimental	4	8	12	2	6	8	no
63	Experimental	16	8	24	12	14	26	yes
64	Experimental	4	4	8	6	2	8	no
65	Experimental	4	12	16	4	10	14	no
66	Experimental	4	10	14	2	8	10	no
67	Experimental	8	6	14	2	8	10	no
68	Experimental	10	6	16	4	6	10	no
69	Experimental	2	2	4	12	10	22	no
70	Experimental	2	6	8	6	8	14	no
71	Experimental	10	8	18	10	8	18	no
72	Experimental	2	10	12	14	8	22	no
73	Experimental	8	12	20	16	4	20	yes
74	Experimental	14	0	14	8	8	16	no
75	Experimental	8	0	8	6	10	16	no
76	Experimental	4	6	10	4	4	8	no
77	Experimental	6	8	14	10	10	20	no
78	Experimental	10	4	14	8	8	16	yes
79	Experimental	12	4	16	8	6	14	yes
80	Experimental	8	12	20	6	6	12	yes
81	Experimental	4	4	8	4	4	8	no
82	Experimental	0	2	2	6	6	12	no
83	Experimental	8	8	16	8	8	16	no
84	Experimental	6	6	12	6	10	16	yes
85	Experimental	4	10	14	12	8	20	no
86	Experimental	8	4	12	8	14	22	no
87	Experimental	8	6	14	6	6	12	no
88	Experimental	4	6	10	8	8	16	no
89	Experimental	6	4	10	10	12	22	no

RAW SCORES (Continued)

ID	Group	Pretest Pitch	Pretest Rhy	Pretest Comp.	Posttest Pitch	Posttest Rhy	Posttest Comp.	Prior Piano
90	Experimental	12	8	20	16	10	26	yes
91	Experimental	6	6	12	6	6	12	no
92	Experimental	6	8	14	6	10	16	no
93	Experimental	4	4	8	6	4	10	no
94	Experimental	10	10	20	8	16	24	no
95	Experimental	12	6	18	8	8	16	no
96	Experimental	6	6	12	14	8	22	no
97	Experimental	10	12	22	12	14	26	yes
98	Experimental	6	8	14	10	8	18	no
99	Experimental	18	6	24	6	10	16	yes
100	Experimental	4	6	10	6	8	14	no
101	Experimental	6	8	14	6	10	16	no
102	Experimental	12	10	22	10	10	20	no
103	Experimental	4	6	10	8	6	14	no
104	Experimental	6	6	12	8	8	16	yes
105	Experimental	12	8	20	6	14	20	no
106	Experimental	4	6	10	6	8	14	no
107	Experimental	4	8	12	8	8	16	yes