TEACHING PIANO SKILLS TO HANDICAPPED PERSONS
THROUGH USE OF SYSTEMATIC INSTRUCTION:
A PROPOSAL

DISSERTATION

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

By
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* * * *

The Ohio State University
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Copyright by
Elva Tice Michal
1987
This study is dedicated as a memorial to my mother,

Bertha L. Tice.
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# TABLE OF CONTENTS

DEDICATION ........................................ ii
ACKNOWLEDGMENTS ................................ iii
VITA ................................................. v
LIST OF FIGURES ................................... ix

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION .................................. 1</td>
<td></td>
</tr>
<tr>
<td>Introduction .................................... 1</td>
<td></td>
</tr>
<tr>
<td>Historical Background .......................... 2</td>
<td></td>
</tr>
<tr>
<td>Need for the Study ............................. 8</td>
<td></td>
</tr>
<tr>
<td>Statement of the Problem ........................ 11</td>
<td></td>
</tr>
<tr>
<td>Purpose of the Study ........................... 12</td>
<td></td>
</tr>
<tr>
<td>Limitations of the Study ....................... 13</td>
<td></td>
</tr>
<tr>
<td>Basic Assumptions of the Study ............... 14</td>
<td></td>
</tr>
<tr>
<td>Definitions .................................... 15</td>
<td></td>
</tr>
<tr>
<td>References ..................................... 15</td>
<td></td>
</tr>
<tr>
<td>II. REVIEW OF THE LITERATURE .................. 19</td>
<td></td>
</tr>
<tr>
<td>Introduction .................................... 19</td>
<td></td>
</tr>
<tr>
<td>Systematic Instruction: The Historical Perspective .... 20</td>
<td></td>
</tr>
<tr>
<td>Behavioral Principles and Systematic Instruction: Use in Special Education ........ 23</td>
<td></td>
</tr>
<tr>
<td>Developmental Psychology and Systematic Instruction: Use in Special Education .... 30</td>
<td></td>
</tr>
<tr>
<td>Systematic Instruction: Use in Music Education .... 32</td>
<td></td>
</tr>
<tr>
<td>Systematic Instruction: Use in Piano Pedagogy .... 36</td>
<td></td>
</tr>
<tr>
<td>References ..................................... 49</td>
<td></td>
</tr>
<tr>
<td>III. DESCRIPTION AND ADAPTATION OF SYSTEMATIC INSTRUCTION COMPONENTS TO TEACH KEYBOARD SKILLS TO HANDICAPPED STUDENTS IN AN INDEPENDENT MUSIC STUDIO SETTING .......... 58</td>
<td></td>
</tr>
</tbody>
</table>

vii
Introduction ................. 58
Components of Systematic Instruction .......... 61
Description of DTIMS as Presented by Stephens .... 66
Adaptation of Systematic Instruction to Piano
Instruction .................. 70
Organization Within a Private Studio Setting .... 73
References ................... 106

IV. ANALYSIS AND DISCUSSION ................. 109
Introduction ................... 109
Analysis and Discussion of Questions .......... 110
References .................... 130

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS .... 131
Summary ...................... 131
Conclusions ................... 134
Recommendations ............... 136
References .................... 140

APPENDICES

A. Format for Individualized Music Educational
   Plan ........................ 141

B. Interview Guidelines ................. 143

C. Classification Steps Within the Instructional
   Area of Technique Including Examples of
   Criterion Measures (Skill Statements) ....... 145

D. Sample: Use of the Systematic Instruction Model
   to Teach a Handicapped Student ............... 156

BIBLIOGRAPHY ..................... 171

viii
# List of Figures

<table>
<thead>
<tr>
<th>Figures</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flow Chart</td>
<td>.76</td>
</tr>
<tr>
<td>2. Milestones in Piano Skill Development for Handicapped Persons</td>
<td>.81</td>
</tr>
<tr>
<td>3. Booklet of Graphs</td>
<td>.91</td>
</tr>
<tr>
<td>4. An Example of a Task Analysis of Subcategories</td>
<td>.97</td>
</tr>
<tr>
<td>5. Progress Chart Showing Current Level of Function</td>
<td>159</td>
</tr>
<tr>
<td>6. Progress Chart Showing Annual Evaluation</td>
<td>170</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

Introduction

The development of keyboard instruction for handicapped students has evolved from the conviction that music is for everyone. Within this philosophy lies the implication that music instruction, then, must also be available to anyone who wishes to learn music-making skills. Changes in methodology have been necessary to make this philosophy into a workable instructional procedure, for the earliest piano instruction was an exclusive design. Virtuosity and technical facility, requiring hours of practice and years of serious study, were the goals to be achieved by the wealthy and the musically gifted.

As music instruction became more accessible, greater value was placed on creative expression rather than pure technical skill, and for the first time instruction for the average student was considered to be important. At this stage the necessity of defining long term goals for students became apparent, for the degree of skill acquisition and the type of literature studied varied with a student's determination to use piano performance as a
lifetime career or as a life-enrichment activity. Piano instruction for the handicapped learner has grown from this background and is now creating a history of its own. Piano pedagogues must again rethink priorities and design appropriate methods which will enable handicapped learners to become active music makers as well as appreciative listeners. New methods for teaching piano to handicapped learners must be built on the foundations of knowledge previously forged in three areas: music education, piano pedagogy, and special education. The belief that music is for everyone will be reaffirmed by finding appropriate ways to teach keyboard skills to the handicapped learner.

**Historical Background**

Private keyboard instruction has undergone dramatic changes since early American times. Although itinerant music teachers were reported to have taught private lessons in the early eighteenth century, private instruction was usually available only to the wealthy. In the 1800s, principles for early keyboard instruction were developed by European artists and pedagogues. One instructional approach, referred to as the "finger school", required intensive hours of practice, and followed three principles:

1. The performer must use only the fingers, keeping the upper parts of the arm fixed
2. Technical training is a mechanical procedure acquired by many hours of daily practice.

3. The teacher is the absolute authority.  

Uszler reported that in the early 1800s, beginning students were expected to have an hour lesson every weekday and to practice daily for an hour in addition to that since the purpose of keyboard instruction at that time was to develop a virtuoso performer. Mid-eighteenth century children who received keyboard instruction were generally those with high musical potential, whose families valued and participated in musical activities.

The first method book written specifically for the pianoforte was introduced in Europe about 1802 by Louis Adam, a keyboard player of the Paris Conservatory. In America, Nathan Richardson published an early piano method in 1859 entitled The New Method for the Pianoforte, and in 1892, W. S. B. Mathews published a course of piano study. In the early 1900s, many more piano methods for beginners appeared, such as materials by Mrs. Crosby Adams, Angela Diller, and Jessie Gaynor.

In the early 1880s, Calvin Cady began to apply the class teaching system to piano instruction. Now piano lessons could be less expensive and more accessible to a larger segment of American society. Many pedagogues began to question the earlier instructional methods of isolated and mechanistic technical virtuosity. By the mid-1900s,
repetitive drill of technical studies was used to build a foundation upon which a performer could acquire the skill to express the musical content of the piece. Technical virtuosity was no longer considered to be an end in itself.\textsuperscript{11} Since the 1940s, an approach combining individualized instruction and an emphasis on development of musical understanding has become gradually accepted as a better way to develop the skills of all types of students, both those with average ability and those with exceptional talent.\textsuperscript{12} Until recently, however, piano instruction for students with handicaps rarely was mentioned, and methodological guidelines remained undeveloped, leaving this important group of potential students as yet unserved.

In early America, handicapped persons tended to be overlooked as potential participating members of all except the most fundamental activities.\textsuperscript{13} Society assumed that the handicapped, especially those with mental handicaps, were unable to learn; therefore, most academic skills and life enrichment activities were not available to this group.

By 1880 music activities were included in most American training schools for the feebleminded, although they were probably used for therapeutic goals rather than for cultural enrichment or personal satisfaction.\textsuperscript{14} In 1904, a textbook dealing with the subject of psychology as
related to the teaching of music was written by E. F. Bartholomew, entitled *The Relation of Psychology to Music*. It would appear that goals in music for the handicapped population, at this time, were focused more toward the area of music therapy than toward music education.

In the field of music, the demand for piano virtuosity and resulting exclusion of all but the most brilliant students for private study was being modified, but the use of piano instruction for attainment of leisure skills rather than career-oriented instruction was not yet accepted by leading piano pedagogues. For example, in 1915, Harriette Brower interviewed many artists and pedagogues who discussed educational principles being used to teach talented students who were involved seriously in music study. No guidelines were offered for students who wished to play only for pleasure. Kammerer's description of the musical climate which existed before the 1940s alluded to the selectivity of prospective piano students. He quoted Gluck's epigram: "There are only two kinds of students - pupils and stupils", and also quoted Josef Hofmann from "The Etude" (October, 1936) who said that a child "who cannot take a righteous amount of technical discipline to earn his musical pleasure had better not take up the piano at all." These factors would imply that at that time there would have been little support for
development of a specialized curriculum for
difficult-to-teach students. Some piano teachers may have
attempted to teach students of below-average ability or
students with other handicapping conditions, but most would
have faced overwhelming difficulties, for adapted
curriculum and behavioral piano pedagogy methods were not
yet available.¹⁸

Only two reports of private piano lessons for
handicapped students during these early years were found in
the literature, and in both sources, students were taught
by specially trained staff in institutional settings for
the handicapped.¹⁹ No reports were found to indicate that
any handicapped students were taught by independent piano
teachers at that time.

In the early years of special education, handicapped
children, especially those who were blind, deaf, or
mentally retarded, were educated in separate classes or
schools. It was believed that students could proceed at a
faster pace in such an environment because classes were
smaller and instruction tended to be more individualized.
In the 1960s, critics of special classes began to express
doubt that separation offered any educational advantage to
special children, and recommended integration of
handicapped and nonhandicapped children in regular
classes.²⁰ In 1975, the Education For All Handicapped
Children Act (PL 94-142) was passed. Designed by parents
of handicapped children in consultation with their lawyers, this law opened the door to new opportunity for the handicapped. Now handicapped children must have equal opportunity for a free and appropriate education in the least restrictive environment.\textsuperscript{21} As a result of this law, handicapped students were mainstreamed into regular classes whenever possible. Public school music classrooms frequently were selected for integration, sometimes because it appeared to be a proper placement for a child, but many times because it was an easy way to fulfill mainstreaming requirements. Although this created considerable controversy, it also brought to the attention of educators the need for specialized teacher training, for most music teachers had been trained to teach only typical students.\textsuperscript{22}

As parents of the handicapped reached out with new awareness of potential opportunities, many handicapped children began to receive some of the enrichment experiences which had been offered traditionally only to "normal" children. As a result, independent piano teachers began to receive requests to teach students with diagnosed handicaps, and found themselves faced with the challenge of how to teach children who did not always learn according to the "norm". Isolated case study reports began to appear in the literature describing attempts to teach piano skills to the handicapped; however, most approaches which were
reported failed to give conclusive direction in methodology to those piano teachers who wished to include handicapped children in their teaching schedule. A need for guidance was evident. Some handicapped children were able to learn through traditional instruction in spite of their problems. Others were not able to read staff notation, could not comprehend or use simple rhythmic concepts, and could not retain information over the week-long span of time which separated one lesson from another. For these children, traditional instruction would not work. If these students were to succeed, new ways of teaching must be found.

Need for the Study

Only a few studies were found that addressed the question of need for piano instruction for handicapped learners. Trombley surveyed music therapists, independent piano teachers, and university personnel in the Great Lakes region who were involved with piano instruction for the handicapped child. She discovered that many children with various handicapping conditions presently are receiving piano instruction in this geographical area, and that a variety of resources is being used by piano teachers to teach handicapped students. Although 43 percent of the respondents in the study favored specific teaching methods, no single, widely accepted curriculum was identified.23
Steele and Furman conducted a survey of music teachers drawn from membership of the Music Teachers' National Association (MTNA). They reported an increase in the number of requests for services to handicapped students, and suggested that there seems to be a growing concern among private teachers, evidenced by recent articles in The American Music Teacher, Clavier, and Keyboard Magazine. Of the 193 respondents, 69 piano teachers were teaching special students. Only five of these had received special training. The authors concluded that private music teachers desire assistance in teaching special students, suggesting that music therapists could be trained as consultants to provide an internship experience to undergraduate students before graduation.\textsuperscript{24}

Lawrence\textsuperscript{25} described musical and nonmusical achievements of 11 handicapped students who were taught functional keyboard skills through private piano lessons at The Neighborhood Music School in the Bronx, New York, and at the Harbor Conservatory for Musical Growth in Hewlett, New York. He proposed four teaching guidelines for the private piano teacher who wishes to teach handicapped students. First, an individualized program must be designed for each handicapped student. Second, goals and standards must be established within the limitations of each student. Third, specific procedures and techniques, compatible with current research in special education, must
be followed. Fourth, a trial-and-error approach to finding suitable techniques for particular problems is mandatory. His work has provided the basic foundation, both in philosophy and in methods, for teaching piano skills to handicapped students.

Other authors have reported observed gains in both music and nonmusic areas as a result of piano study. Krebs, in a review of literature concerning music education for the mentally handicapped, reported that preliminary research supports these conclusions:

1. Music aids the exceptional child in learning academic subjects such as mathematics, reading, and language
2. Music plays a role in memory retention, sensory education, and the lengthening of attention span
3. Music assists in behavior modification of activity level, initiation, social interaction, self-help skills, and related attitudes
4. The mentally handicapped can achieve musical competence, but at a slower rate than that of a normal child
5. Keyboard experiences enhance music learning for the mentally handicapped and for exceptional children at all levels of intelligence, having demonstrated a gain in musical achievement through keyboard activities
6. The best setting for music instruction of the mentally handicapped is at present undetermined. These studies lend support to the proposal that piano instruction can be a successful endeavor both for piano teachers who expand their teaching to include handicapped students and for the students whom they teach. Summary of these cited studies suggests that:

1. There is a demand for piano instruction for handicapped students
2. There is a need to identify and test appropriate methods to teach piano skills to this population
3. Acquisition of piano skills can result in increased enjoyment of music activities, serve as a means for appropriate self-expression, and enhance the quality-of-life experiences for handicapped persons.

Statement of the Problem

The opportunity to study and acquire keyboard performance skills should be available to all persons who wish to learn. For the student with special problems such as mental retardation, visual or auditory impairment, perceptual problems, or physical disabilities, the usual pedagogical approach and materials may not be effective. The problem for this study was to adapt an existing instructional system and apply it to the specific area of
piano instruction. This systematic instruction model\textsuperscript{27} has been documented as an effective instructional technique in special education. Questions which were addressed in this study included:

1. Is the systematic instruction model an appropriate system for teaching keyboard skills to students with handicaps?
2. How can the systematic instruction model be adapted to teach keyboard skills?
3. Is there a developmental order to the presentation of keyboard skills?
4. Is it possible to develop measurable objectives from a developmental sequence of piano instructional steps?
5. Is such a system practical for use in a typical independent piano studio setting?
6. How can individual student progress be monitored from week to week in such a setting?
7. Is it realistic to propose that such a system be used by piano teachers who do not have specialized training in special education?

**Purpose of the Study**

The purpose of the present study was to propose the adaptation of the systematic instruction model to teach keyboard skills to handicapped students. This model has
been documented in the literature as an effective procedure for teaching academic, vocational, and daily-living skills to handicapped persons. 28 The focus of this study consisted of describing the adaptation process and demonstrating how such a process could work in the private studio of an independent piano teacher.

Limitations of the Study

Since the 1940s, most pedagogues have agreed that an instructional sequence for piano study should encourage development of total student musicianship rather than pure mechanical procedures or proficiency in isolated skills. 29 For students who are handicapped, however, it may be necessary to isolate specific skills and to concentrate on development of measurable components of technique to assure the mastery of each part. Therefore, the following areas form boundaries which limit the dimensions of this study:

1. Subjective instructional areas are difficult to measure behaviorally and were excluded; for example, areas such as tone color, melodic shape, and rhythmic nuances are not included in this study

2. Only the prerequisite skills and fundamental stages of beginning piano instruction were used for the present study, excluding materials and concepts beyond a late elementary level of difficulty. A similar piano instructional approach to higher
levels of achievement would be recommended for use if needed

3. The study excluded any recommendations of a particular graded method book or style book to be used as a curriculum resource.

Basic Assumptions of the Study

The following assumptions were basic to the investigation:

1. All persons should have the opportunity to learn piano performance skills within the limits of their ability, handicap, or interest

2. The development of piano performance skills for the handicapped learner can best be achieved through an instructional sequence which embodies developmental theory and behavioral techniques

3. Piano skills are learned by the handicapped student in the same order and sequence as for the typical student, although progress will be slower

4. The role of the teacher is to assess initial skills, provide an appropriate instructional program which is designed individually for each learner, collect observable data, provide immediate feedback as to correctness of response, reassess for mastery of objectives, and either revise the program or design the next step of instruction.
Definitions

Handicapped Student: Because a piano teacher may or may not be given a medical diagnosis of a handicap, the definition of a handicapped student must be very broad. For the purpose of this study, a handicapped student is one who cannot show measurable progress in piano skill development without special planning or special services.

Music Education: A program of study whereby musical understandings and skills are developed by the realization of musical goals.

Music Therapy: A program of study which uses music as a method to develop primarily nonmusic goals.

Piano Instruction: For purposes of this study, the terms, piano instruction and keyboard instruction, will be used interchangeably. Both will refer to a system of developmental steps in six instructional areas of piano skill development which, as they are mastered, will result in the ability to perform recognizable, harmonized melodies within difficulty levels which include prerequisite skills and fundamental stages of beginning piano instruction.

Systematic Instruction: For purposes of this study, systematic instruction will refer to the four components of assessment, planning, instruction, and evaluation which interact within a planned educational design for the purpose of helping handicapped students develop keyboard skills.

References


4. Ibid., p. 12.


11. Ibid., p. 33.

12. Ibid., pp. 51-59.


16. Harriette Brower, Piano Mastery (New York: Frederick
A. Stokes Co., 1915).


18. Uszler and Larimer, pp. 9-12.


CHAPTER II
REVIEW OF THE LITERATURE

Introduction

The idea of teaching piano skills to handicapped persons is not an original one, for many reports in the literature document attempts of music instructors to expand their teaching to this area. However, in spite of the effective use of systematic instruction to teach both academic and nonacademic skills to the handicapped population, very few authors discuss its potential for teaching piano skills. In order to present a complete overview of systematic instruction, five neighboring areas were researched for this literature review:

1.0 The historical perspective
2.0 Use of behavioral principles and systematic instruction in special education
3.0 Use of developmental psychology and systematic instruction in special education
4.0 Use of systematic instruction in music education
5.0 Use of systematic instruction in piano pedagogy.

As an attempt to systematize the many reports which were found, the area of piano pedagogy was subdivided into
five additional sections which included:

5.1 Use of a systems or behaviorally based approach to teach piano skills

5.2 Reports of instruction of handicapped students which do not specify the method of piano instruction

5.3 Reports which suggest use of a nonbehaviorally based method

5.4 Use of the piano to master nonmusical goals

5.5 Specially designed music materials or equipment used to teach handicapped students.

1.0 Systematic Instruction: The Historical Perspective

Systematic instruction has evolved over a long period of time from developments in many fields, including business, industry, engineering, and government. Realizing its potential for instruction, educators adapted its use to increase achievement in many academic subjects, in music classrooms, and for use in special education. Because of its diverse background, there is little agreement as to what is meant by the term, systematic instruction, what components are included in its use, and at what operational level it can be used. Prentice suggests that there are three generalizations which are common to its use in most fields:

1. Use of systematically designed instruction will
bring about a predetermined and predictable outcome

2. Evidence of its effectiveness is available on a continuous basis

3. By analyzing and evaluating such evidence, modification and redesign can be achieved.¹

Wong and Raulerson concur with Prentice that, although terminology may vary with different disciplines, the components are essentially the same. Wong and Raulerson suggest these components to be:

1. Preassessment or pretesting
2. Behaviorally stated objectives
3. Well-defined learning tasks
4. A process of data gathering and analysis
5. Posttesting
6. Evaluation and modification.²

Systematically designed instructional programs have been used by American educators since the 1960s. In 1966, the U.S. Office of Education conducted a study of such programs which were designed originally to increase academic achievement for public school students in Alabama, Florida, Michigan, and Utah, and for university students in colleges throughout the country. Prentice described three of these early programs in her article.³ Warren explained the use of systematic instruction to prepare adults for the GED High School Equivalency certificate through a Kentucky Educational Television instructional series.⁴ Use of the
systems approach in educational programming provided a foundation upon which later developments in special education and music education were based.

An emphasis on accountability in the schools during the 1960s influenced teaching methods in both regular classes and special education classes. The systems approach, with its emphasis on statement of measurable objectives combined with observational data collection, not only appeared to increase student achievement, but also was a very visible procedure which fulfilled administrative accountability requirements. Meanwhile, parents of handicapped children were becoming a vocal force in their demand for equal educational opportunity for the handicapped. Thus, designing and testing teaching methods to increase the quality of instruction became a high priority for special educators. The result would be increased productivity and independence for the handicapped population. Development of systematic instruction appeared to have the potential for tremendous impact on educational procedure for persons requiring special instruction.
2.0 Behavioral Principles and Systematic Instruction: Use in Special Education

Behaviorism began in the early part of the twentieth century with experiments by John B. Watson and Edward L. Thorndike. Later, B. F. Skinner launched the use of operant conditioning which provided the foundation for the reinforcement theory which is used successfully with the handicapped population today. Applied behavior analysis, based on behavioral principles, provided a systematic framework to enable students to learn more effectively. Sulzer-Azaroff and Mayer defined applied behavior analysis as a "systematic, performance-based, self-evaluative method of changing behavior". The systematic model proposes that most behavior is caused by its consequences. In a systematic classroom, the teacher observes the consequences which occur and structures a change in the consequences, when needed, enabling increased learning or behavioral change to occur. This model has become a very important part of teaching basic skills to handicapped students.

Systematic instruction, as it is used in special education, has developed through an evolutionary process from Itard's first attempt to educate "Victor", a retarded boy in Aveyron, France, in the early nineteenth century. Other leaders, such as Sequin and Howe, were important to the later development of educational programs for the mentally retarded. Edward Sequin began a school for
retarded children in Paris in 1837 and later founded the Pennsylvania Training School in the United States, while Samuel Howe was the first person to advocate educational programs for mentally retarded children in the United States. In the early 1900s, institutions serving the mentally retarded in America became overcrowded and understaffed. A period of institutional warehousing followed during which time little more than basic custodial care was offered to residents. Educational programs for teaching independent-living skills, as well as those teaching functional academic skills, were almost nonexistent.⁸

Enthusiasm for better education in all areas gained momentum during the World War II years. An idea for developing specialized skills with systematic analysis of trainer devices, (for example, air-traffic control simulation trainers) was originated in modern military and industrial installations during this period.⁹

After World War II, interest grew in the development of self-instruction devices or teaching machines. Early in the 1950s, Skinner developed an automated teaching machine as a means of extending to human learning the operant conditioning principles that had been useful with animals. The teaching machines facilitated "individual control of the materials of learning, insured active participation of the student, and provided immediate knowledge of accuracy."
They permitted the student to work at his own rate and to know his progress in objective terms".\textsuperscript{10}

These ideas were forerunners of the programming techniques now used to teach handicapped persons. Over a period of time, elements from developmental theory and behavioral principles merged to form a systematic approach to teaching the handicapped. This alliance has supported a basic conviction for special educators that all students can learn, and supports the philosophy that although students have a responsibility for and must be involved in their own learning, teachers are primarily responsible for ensuring that learning actually does occur.\textsuperscript{11}

Ayllon and Azrin conducted one of the earlier studies using operant reinforcement theory to modify behavior of patients in a mental hospital ward.\textsuperscript{12} More recently, Stephens described the procedure for this systematic approach, which he termed the Directive Teaching System. He says:

An instructional point of view begins with descriptions of a student's performance in comparison with specific behaviors to be learned. Instructional plans are implemented to assist in achieving those behaviors. Lastly, student performance is evaluated to determine if the performance meets acceptable criteria. If it does, additional responses to be learned are identified. If performance is unacceptable, additional instruction, with possible changes in strategy, is used until criterion is met.\textsuperscript{13}

Textbooks which propose effective intervention strategies for teaching handicapped persons do not limit behavioral methods to the specific term, systematic
instruction. Other terms, while differing in some aspects, embody the same basic philosophy and many of the same principles. Examples include applied behavior analysis, behavior modification, behavioral engineering, behavioral intervention, contingency management, social learning, direct instruction, precision teaching, responsive teaching, opportunity-to-respond approach, and structured teaching.¹⁴

Bijou described the value which special educators place upon the behavioral approach:

The application of behavior principles to the teaching of retarded children is not another educational fad, and those who might stand around patiently waiting for it to pass will be disappointed. Since it is the end product of 50 years of experimental research and theory construction, it is likely that with continued support of basic and applied research, it will become even more effective.¹⁵

Many sources recommend this kind of structured approach for teaching academic and vocational training skills to students who are mildly handicapped as well as prevocational, vocational, and self-help skills to persons who are either moderately, severely, or profoundly handicapped. Cegelka and Prehm stated, for example, that success in teaching the profoundly retarded population is achieved by the application of behavioral principles and systematic instruction.¹⁶ McCormack expressed a need for systematic instruction which included major components of individualized instruction and informal methods of assessment to teach severely handicapped students.¹⁷
Heward and Orlansky stated that the behavioral approach, often referred to as behavior modification or applied behavior analysis, is the most popular and widely used method for teaching mentally retarded students. They defined applied behavior analysis as systematically arranging environmental events to produce desired changes in behavior.\textsuperscript{18} Snell proposed the use of systematic instruction to teach the moderately and severely handicapped. In her textbook, she included components of:

1. Measuring the behavior
2. Analysis of performance data to evaluate the effect of a particular instructional program at each stage of learning
3. Moment-by-moment awareness of interactions between all elements of task performance
4. An awareness of the consequences which the learner receives for a particular performance.

Snell indicated that systematic instruction provides a guide for curriculum which is designed to meet the needs of the learner.\textsuperscript{19}

Some authors have designed specific resources which embody the systematic instruction approach. Examples include the lattice technique, originated by Woolman in 1962. The lattice is a graphic display of the components and sequence of skills required to complete a task. It differs from task analysis in that it is not an
instructional sequence, but only displays the components and sequence of skills in a standardized format. The lattice technique has been used for various instructional areas; in 1972, for example, Bricker and Bricker used a lattice design to display the sequence of language acquisition.

The Directive Teaching Instructional Management System (DTIMS), a skill training method designed by Stephens, is another example of such a resource which is used to teach mildly handicapped students. Included in this program is a curriculum for assessing and teaching arithmetic, reading, and social skills. Stephens' approach, based on direct observation and performance, will provide a model for the adaptation of systematic instruction to teach piano skills to handicapped children for the present study.

Other elements of the systematic instruction method include a concept of mastery learning, proposed by Bloom, Hastings, and Madaus, in which high criterion standards are set for student performance. Instruction continues on a particular task until the student reaches the degree of proficiency which has been determined by the criterion statement.

Based on a mastery concept, task analysis is also a major component of the systematic instruction method. After the primary divisions of an area have been identified, a task analysis subdivides each part into
sequential steps which become curriculum objectives to be mastered. Each step is then evaluated for mastery before the next step is taught. Upon mastery of the last step, the identified task can be performed successfully.\textsuperscript{24} Williams and Gotts described how a skill sequence provides a framework of tasks or objectives around which curricula may be developed. They defined a skill sequence as "statements of what is to be taught and in what order".\textsuperscript{25} Kauffman and Snell used the term, developmental sequence, and described how instructional tasks may be subdivided into small teaching steps which are ordered from the easiest (first step to be taught) to the most difficult (target behavior). These teaching steps are then used as checklists to determine how much of the skill is already present before teaching, where to begin teaching, and to determine how much the student has learned after teaching.\textsuperscript{26} In 1976, Gold reported successful acquisition of complex vocational skills by severely handicapped persons with this technique.\textsuperscript{27}

By using task analysis in concert with the concept of mastery learning, an individualized curriculum for the handicapped learner is developed. Each step of the task analysis has become an instructional goal of this curriculum which, upon mastery, allows the student to progress to the next steps until the target objective has been reached. The teacher's task, then, is to write these
curriculum objectives in measurable terms so that the behavior can be accurately assessed. Mager, in 1962, presented a thorough format for the writing of goals and objectives so that each can be measured behaviorally for mastery.28

Principles of systematic instruction are based on behavioral theory, but developmental psychology has also played an important role in the shaping of an effective method of instruction for handicapped students. It is in the interaction of both views that systematic instruction becomes a useful tool for this group of students.

3.0 Developmental Psychology and Systematic Instruction: Use In Special Education

Claude Bernard stated that even the most beautiful of theories is never as beautiful as truth or fact.29 This helps to explain why psychologists have disagreed over the years about the nature of learning. It is only in the gathering of many theories, ideas, and perspectives that one can begin to glimpse "truth" about how children learn.

There are different schools of thought in psychology which usually focus on one major aspect of the learning process. Psychology emerged as an independent and primarily experimental science which grew out of a blending of current trends in philosophy and physiology. The study of personality and its role in the understanding of
behavior was the impetus for the birth of this discipline in the 1870s. Wilhelm Wundt attempted to analyze the conscious experience (the mind) into basic elements, his method patterned after the experimental method approach which was being used by the natural sciences. In the early 1900s, Behaviorism, led by John B. Watson, opposed Wundt's focus on conscious experience. This branch of environmental learning tradition proposed that behaviors which are rewarded within a structured framework of reinforcing conditions have a higher probability of recurrence. Growing from the theory of tabula rasa (blank slate) by John Locke, emphasis was focused on environmental influence, skepticism about a natural course of development, and belief in drill and training.

Developmental theory in psychology grew from the notions of critical time periods and maturation. Stage psychologists identified periods of life characterized by the onset of a behavior or the predominance of a behavior. Many psychologists contributed to the knowledge of behavioral milestones through which children proceed at particular ages, but the first and most acclaimed representative of this cognitive school is Jean Piaget.

Cognitivism and developmental theory have provided educators with valuable information concerning the sequential development of intelligence and the expected age at which most children proceed through each stage. Piaget
defined four main periods of intellectual growth. His theory has given educators a tool with which to measure developmental levels for persons who may or may not reach these stages at an appropriate chronological age. Piaget suggested that learning is a function of development, and that all children pass through the stages of cognition in the same order, but not necessarily at the same age. His proposal provided the developmental framework within which behavioral management programs could function.

Content of these two theories of Behaviorism and Cognitivism have few similarities but do serve to complement each other. In many ways, the Behavioristic approach is incompatible with Piagetian theory. The teaching implications of these two approaches, however, are not necessarily in opposition. By combining the two schools of thought through use of a systematic approach to instruction, teachers can now assess mastery of small steps of development in various skills and plan or "program" objectives which can be taught.

4.0 Systematic Instruction: Use in Music Education

Behavioral principles and use of a developmental approach have formed an important component for many studies investigating the use of music for both handicapped and nonhandicapped persons. Much research using an operant approach in music has been concerned with motivation and
more recently, much research has been directly concerned with affect.\textsuperscript{35} However, many investigators have expressed the need for a sequential approach to presentation of skills in various areas of music education, and a few writers have made attempts to develop such an approach.

Simons, for example, expressed concern that lack of systematic developmental sequences has caused music education to lag far behind the other primary school subject areas in evaluation of learning.\textsuperscript{36} He developed an instrument to measure the degree to which prespecified music listening skills were attained in kindergarten and in grades 1, 2, and 3, based on the premise that much of music learning is objective and factual, therefore making its attainment measurable. Hufstader investigated the possible existence of a learning sequence for music listening skills associated with timbre, rhythm, melodic pitch patterns, and harmony.\textsuperscript{37} His study demonstrated that there is a developmental sequence for these skills, and he was able to identify the grade levels at which listening skills are acquired. However, his study reflected only group means, not individual scores. Zimmerman reported a developmental sequence in sound discrimination as well as in concept formation.\textsuperscript{38} She stated that current research stresses the importance of developmental sequence and of teaching sequences. In a five-year longitudinal study, Davidson, McKernon, and Gardner identified milestones of development
of song acquisition, and examined seven different symbolic
media coincident with the emergence of musical skills.\(^{39}\)
Christ sequenced a cognitive developmental order of musical
skills and found that acquisition of these skills was
consistent with cognitive characteristics found in the four
stages as defined by Piaget.\(^{40}\)

Many instructors of classroom music have reported the
use of specific elements of systematic instruction such as
step-by-step presentation of musical skills and objective
evaluation systems to measure skill acquisition. Keene
reported that in 1883, Hosea Edson Holt, author of the
Normal Music Course Series, measured musical progress by
monitoring sight singing ability.\(^{41}\) More recently, Diamond
suggested use of the systems approach for music classes.\(^{42}\)
Bobbitt found that a sequential program based on Skinnerian
principles was effective in improving fifth graders' music
reading skills.\(^{43}\) Boyle discussed the use of instructional
objectives as resources for planning instruction and
evaluating achievement in music classes.\(^{44}\) Biringer
developed a curriculum based on the systems approach for a
beginning string class.\(^{45}\) The curriculum included:

1. A basic set of behavioral objectives
2. Teaching strategies using currently available, published materials
3. Alternative modes of presentation
4. Criterion-referenced assessment instruments,
designed by the author, to measure the stated objectives.

In Biringer's study, the curriculum was effective to the 80 percent minimal achievement level by at least 90 percent of the seventh grade students.

Jetter developed a systematic model to teach musical concept development in normal second grade children.46

Included in her model are components of:

1. Behavioral objectives
2. Strategy: instruction and drill
3. Written evaluation of student performance
4. Analysis of evaluation
5. New objectives.

In 1973, Labuta published a guide for music teachers which described how to apply the systems approach and systematic instruction to classroom teaching. Labuta stated that "accountability means that music teachers are responsible for the learning of each individual pupil as well as for the training of bands, orchestras, and choruses."47 By careful planning and consistent measurement of objectives, musical progress of individual students within the class can be monitored.

The private studio teacher may find it easy to operate within this philosophy of individualization since students usually are taught one-on-one or in small groups. The concept of accountability for the private teacher, however,
rarely has been mentioned in the literature. Student progress usually has been measured subjectively by the number of methods books which have been completed, with performance skills demonstrated at recitals and competitions. A recent report by Barry, however, suggests that behavioral accountability has value in the independent studio setting.48 As a part of her doctoral studies, Barry devised a behavioral training procedure for teaching five designated music skills to private woodwind students. Students included in this group surpassed the performance of students involved only in traditional style teaching on all test items, indicating that systematic instruction can be beneficial for normal students in a private studio setting.

5.0 **Systematic Instruction: Use In Piano Pedagogy**

Most references which proposed the use of behavioral principles to teach piano to handicapped persons were written by music therapists who used piano instruction as a part of a therapy program. Rancer suggested that only persons with special training in behavioral techniques can be successful in teaching students who are handicapped, and recommended that parents search out a music therapist in private practice as a piano instructor for their handicapped child.49 Steele agreed that some private teachers with no training or experience with teaching
handicapped students may feel uncomfortable teaching these children. However, in contrast to Rancer's suggestion, Steele encouraged independent piano teachers to learn about different handicapping conditions and the use of behavioral techniques. As an example of how behavioral techniques can be used, she described a directive teaching program for handicapped children who studied piano at the Rainey Institute in Cleveland, Ohio. As a result of a survey conducted by Steele and Furman in 1982, Steele reported that requests to teach piano to the handicapped had increased due to the passage in 1975 of the Education for All Handicapped Children Act (PL 94-142). Because of this increase, she recommended that music therapists be trained to help private teachers who desire assistance in teaching special students.

Steele has written many articles which remain consistent with this philosophy that private piano teachers who wish to teach handicapped students can be successful if given some training in the use of behavioral principles. In a 1979 article she suggested that children in active therapy are often able to respond to traditional piano instruction and can be taught by private music teachers. In a later article she described a procedure involving student referral by the music therapist to a selected independent piano teacher. Although the private teacher taught the student, the therapist was available for
suggestions and guidance. It would appear that in view of the increasing numbers of handicapped students requesting private lessons in piano, an approach of offering assistance to private piano teachers who wish to teach handicapped students is a practical one.

Very few studies were found which reported use of behavioral principles by professional independent piano instructors. Lawrence reported success in teaching piano skills to handicapped students, and although he did not label his approach as systematic instruction, he included the use of behavioral principles in combination with other techniques. Michal developed a computerized intervention program using applied behavior analysis techniques to shape legato performance skills for a nine-year-old mentally retarded piano student.

Many articles were found which included the use of isolated behavioral components to teach piano to nonhandicapped students. For example, Kern, in an interview with Frances Clark, reported her recommendation for a sequential order of teaching as the most effective method for piano instruction. In 1967, Yaggy devised a system for fine grading of instructional materials based on the number of prerequisite pieces which must be mastered before attempting the next.

Many writers of piano curriculum resources use a developmental or spiral approach to piano instruction,
based on Bruner's theory of a spiral curriculum. Pace, for example, has written extensively about the advantages of such an approach, and has demonstrated these ideas in his curriculum materials.\textsuperscript{59} Weil also described the application of Bruner's theory to the teaching of piano in groups.\textsuperscript{60}

The diagnostic/prescriptive teaching movement, discussed in many special education articles, has been reflected in the field of piano pedagogy. Bostrom suggests initial diagnosis of existing problems in specific skill areas when interviewing a prospective piano student, followed by prescription of remediation procedures which are presented in "bite-size pieces".\textsuperscript{61} His article was directed to teachers of normal students who were transferring from another studio.

A few authors have published a list of finely sequenced steps for acquiring specific keyboard skills for nonhandicapped students. Steps in this task analysis are then presented as behavioral objectives to be taught, with each step prerequisite to the next. For example, Blum suggested use of this format to teach keyboard improvisation\textsuperscript{62} and Gray recommended a similar approach to teach jazz.\textsuperscript{63}

Most references to teaching piano to handicapped children seem to fall into five general categories:

5.1 Reports which use a systems or behaviorally based
approach to teach piano skills

5.2 Reports which may or may not describe a case history account, but which do not specify the method of piano instruction

5.3 Reports which suggest use of a specific method other than a systems or a behaviorally based method

5.4 Reports which designate use of the piano to master nonmusical goals

5.5 Reports which indicate use of specially designed material or equipment to teach handicapped students.

In the following discussion, a report was included in the systems or behaviorally based category if it was labeled as "systems", "systematic", or "behavioral" in the document, or if it included use of these three components of systematic instruction: preassessment or pretesting, behaviorally stated objectives, and evaluation/Modification.

5.1 Reports Which Use a Systems or Behaviorally Based Approach to Teach Piano Skills

Only one reference was found which clearly defined a systems approach to teaching piano skills to handicapped persons. Levine and Medema prepared a tape recorded aid for beginning blind students. This self-instructional
set of materials, labeled as a systems approach, lists specific steps in a sequential order to allow a blind person to develop basic piano playing skills. The set consists of five volumes, each volume containing six lessons, an introductory tape, and a review tape. The fourth volume introduces Braille music notation and the fifth volume has a set of original compositions for the student. Volumes four and five include Braille notation as well as recorded music. A teacher guide is included, although a teacher is not needed in order to use the materials. The sequential nature and step-by-step approach qualifies the method to be listed as a systems approach; however, the three behavioral elements of preassessment, behaviorally stated objectives, and evaluation, while perhaps implied, are not written into the program.

5.2 Reports Which May or May Not Describe a Case

History Account, but Do Not Specify the Method of Piano Instruction

Darrow and Heller reported that in 1848, Turner and Bartlett advocated music instruction for the hearing impaired and described a case study of a young deaf woman who could sightread church hymns, had mastered folk songs, and could play beginning exercises at the piano, although totally deaf since the age of 18
months. No reference was made to a specific instructional method. This was the earliest report found which indicated any kind of piano instruction for handicapped persons.

In 1885, the widow of Seguin reported that in her school of seven retarded pupils, one student took violin lessons and two received piano instruction.

In 1940, Weir mentions teaching all ranges of children from the precocious child to the child of retarded mentality. He did not subscribe to a particular method, but listed three objectives for every piano lesson:

1. To enlarge the student's hearing capacity
2. To increase his understanding of music
3. To teach him to play.

Griffin discussed the idiot savant, a person displaying unusual musical skills but whose intellectual capacities fall within a very low functioning level. He reported that while such a gift is rare, with training it is possible for low-functioning students to become quite skilled at "playing by ear". He did not propose a particular method which could be used. Gilles explored the perceptual and cognitive processes involved in music reading which may create music reading problems for the learning disabled piano student, but did not recommend a particular program of instruction.
McCuskey suggested that with the exception of reading Braille music, teaching the blind to play piano is essentially the same as teaching the sighted child. She offered practical recommendations and listed many activities for teaching piano to the visually handicapped. Lam and Wang presented practical ideas to assist the teacher in teaching music in a mainstreamed classroom composed of both blind and sighted students. Knoll listed guidelines for teachers who teach piano lessons to blind music students. Smith described the practical techniques she used to teach a four-year-old blind child to play the piano.

Vawter taught piano lessons to hospitalized mental patients and discussed individual patients and their response to the lessons. Thomson taught private piano lessons at a Veterans' hospital for the mentally ill, and described his materials and procedures.

O'Connell related his experience in teaching piano to an autistic student, describing some of the techniques which he used. Viscott presented a case history of a forty-year-old woman, considered to be mentally retarded, who displayed remarkable memory skills in relating musical facts, demonstrated absolute pitch, played piano and violin, could modulate from key to key, and could improvise a melody in the style of any
given composer.\footnote{77} Coates discussed practical solutions to problems encountered when teaching piano to the physically handicapped student.\footnote{78}

Each of these articles cited positive benefits of piano instruction and described techniques which were used by the teacher. Although many recommendations and practical suggestions were offered, none of the studies advocated a particular method of instruction to teach piano to handicapped students.

5.3 Reports Which Suggest Use of a Method Other Than a Behaviorally Based Method

Many articles consisted of reports by individual teachers whose handicapped students had learned functional piano performance skills. Use of specific methods was discussed in some, although not always labeled. In this category many of the methods were organized developmentally; however, none of the reports included all three elements of preassessment or pretesting, behaviorally stated objectives, and evaluation/modification procedures.

Donaldson taught piano to a deaf student, first by teaching a song by rote, then by using pictures with finger numbers to read notation, and finally by using traditional notation.\footnote{79} Cesaretti designed a piano method for children with multiple physical handicaps.\footnote{80}
Based on Bruner's theory of "metalanguage" in conceptual learning, a representational language to bridge the gap between doing and symbolic thinking, this method provides an ordered sequence of musical experiences, with rhythmic time values being shown by correct spatial and line separation of various notes. A Braille overlay tactually assists the perception of the rhythmical line.

Weber devised an instructional method to teach "trainable" mentally retarded students to play various instruments, including piano, by using a six-note "point-and-play" technique. Silini authored an instructional method to teach piano to the mentally handicapped. Using a conceptual, multi-key approach to the keyboard, Silini presented activities which allow the mentally handicapped to participate actively in the arts.

Each of these articles suggested the use of a special method of instruction, but none advocated an approach which was behavioral in scope.

5.4 Reports Which Designate Use of the Piano to Master Nonmusical Goals

Literature from the field of music therapy contains numerous references to use of piano music and keyboard exploration to achieve nonmusical goals while increasing
proficiency at the keyboard.

For example, Harbert described musical activities used with an eight-year-old girl, deaf and partially sighted, with a cardiac involvement. Music was used in several ways to increase instances of verbalization. Examples included feeling vibrations on the practice room wall, stepping in tempo to piano music by placing her hands on the piano to pick up vibrations, following a rhythmic pattern with one note on the keyboard, and participation in simple action songs. Michie reported ways in which a piano teacher can use therapy in private lessons to increase attention span, improve coordination and develop social skills for the slow student, the homebound student, the emotionally disturbed student, and the active student.

Sister Josepha suggested that in addition to musical benefits, the exceptional child may also receive therapeutic benefits from keyboard instruction, among which she mentioned the strengthening of muscles and joints, aiding in communication, and increasing social skills.

Crocker described the use of piano improvisation to establish a beneficial relationship with a child. For example, a child can respond to the therapist's improvisational piece with his own creation of a simple musical composition to work out feelings of hostility,
aggression, fears, and negative attitudes. In this way, music can become a means for self-expression. Crocker, in another article, reported that playing piano can serve as an emotional outlet, a means of developing concentration, a means of increasing the attention span, an aid to coordination, and training for following directions for a preschool blind child. She said, "Playing the piano seems to be a means of integrating the aural, kinaesthetic, and tactile modalities of learning. It also provides a means of emotional expression that is socially rewarding and inwardly gratifying."87

Maize studied four patients at a state childrens' psychiatric hospital as they were given individual piano instruction.88 The purpose of the study was to observe and report reactions of the students to piano instruction. Changes in the student's ability to relate to another person (the teacher), and the effects on self-image of developing a specific skill were two areas which were observed. Fink reported the case history of an eighteen-year-old female, described as mentally defective, who achieved piano performance skills which contributed to her sense of pride and self-respect.89
5.5 Reports Which Indicate Use of Specially Designed Materials or Equipment to Teach Piano Skills to the Handicapped Student

A few articles were found which fit into this category. McGeorge discussed the work of Welbourne who works with physically handicapped piano students. Encouraging the use of individually designed props such as door stops, potatoes, bottle stops, and pencils as tools to strike the piano keys and produce sound, her emphasis is focused toward development of individual student skills to full capacity. Erickson discussed ways that children with serious hand and arm problems can learn piano skills. Rushmore and Dreaper, Ltd. designed an apparatus which would enable a handicapped child, although unable to stand up and without hands, to play the keyboard of a normal piano or organ.

Simpson authored a course of study designed to accompany and adapt an existing piano curriculum text, written by Bastien, for adult students who are educationally blind. Stoessel and Bowers outlined a method which includes nine logical steps for introducing partially seeing children to the keyboard and to notation. Later, Stoessel reported a selected listing of piano music in various sizes of print for the partially seeing. Davison and Schaub have written a curriculum method series that offers a step-by-step
approach to note reading, rhythm, technique, and knowledge of music symbols, printed in large type for the partially sighted piano student. Mark and McGuire prepared a textbook for sighted teachers who teach the blind as well as a piano method series for blind piano students, available both in Braille and in print.

The emphasis in this category was focused on use of special equipment and materials for the handicapped learner, rather than use of any specific method or procedure.

References


7. Wong and Raulerson, p. 68.


10. Ibid., pp. 245-46.


18. Heward and Orlansky, p. 94.

19. Martha E. Snell, ed., Preface to *Systematic Instruction of the Moderately and Severely Handicapped* (Columbus, Oh.: Charles E. Merrill


32. Gardner, p. 61.


34. Lefrancois, pp. 10-12.


53. See Anita Louise Steele, "Of special note: The


Handicapped Children and Youth, August, 1974), Appendix C.


70. Alice Elizabeth McCuskey, "Teaching Piano to the Visually Handicapped" (Masters thesis, The Ohio State University, 1944).


CHAPTER III
DESCRIPTION AND ADAPTATION OF SYSTEMATIC INSTRUCTION
COMPONENTS TO TEACH KEYBOARD SKILLS TO HANDICAPPED STUDENTS
IN AN INDEPENDENT MUSIC STUDIO SETTING

Introduction

The 1975 passage of PL 94-142, The Education For All Handicapped Children Act, resulted in increased opportunity for handicapped students to participate in many activities which previously had been available only to the nonhandicapped. Requests for private piano lessons increased, and journal articles began to appear which described attempts to teach piano to students whose handicaps ranged from mild to severe. Many approaches were tentative and experimental in nature, but they pointed to some important findings:

1. In spite of their limitations, handicapped students were able to learn piano skills at some level, resulting in positive performance experiences\(^1\)
2. Side benefits of increased creativity, self-satisfaction, and self-esteem for the student were reported as a result of acquired piano skills\(^2\)
3. Piano teachers were positively challenged and
discovered a renewed zest for teaching as a result of their positive interaction with handicapped students.³

Groundwork was laid for a new branch in the area of piano pedagogy. There remained, however, a need for a systematized approach, based on behavioral principles, which could give the independent teacher a structure to follow. Such a design must include a highly individualized curriculum and a system for data collection/record keeping.

The purpose for the present study was to adapt components of systematic instruction to the area of piano study for handicapped students. Patterned after Stephens¹ Directive Teaching Instructional Management System (DTIMS),⁴ the approach for the current study provided an organizational structure which would enable an independent teacher to integrate handicapped students into a typical private studio setting. The study also demonstrated that such an adaptation could result in objective measurement of skills in six areas of piano instruction. In presenting a complete overview of the adaptation of the systematic model to keyboard instruction in a private studio setting, the following topics are discussed:

1.0 Components of systematic instruction
2.0 Description of DTIMS as presented by Stephens
3.0 Adaptation of systematic instruction to piano instruction
4.0 Organization within a private studio setting

4.1 The flow chart

4.2 The instructional areas

4.3 The studio

4.4 The organizational process

4.4.1 Assessment procedures

4.4.11 The folder

4.4.111 Background information

4.4.112 Long term goals

4.4.113 Current level of function

4.4.12 Booklet of graphs

4.4.2 Planning procedures

4.4.21 Instructional objectives

4.4.22 Task analysis

4.4.23 Primary learning modes

4.4.24 Choice of curriculum

4.4.3 Instructional procedures

4.4.31 Choice of supplementary materials

4.4.32 Adaptation of materials

4.4.33 Choice of rewards

4.4.4 Evaluation procedures

4.4.41 Initial evaluation

4.4.42 Weekly evaluation

4.4.43 End of quarter evaluation

4.4.44 Annual evaluation
1.0 Components of Systematic Instruction

Authors differ when listing the exact components which comprise the systematic instructional model. Most, however, agree that systematic instruction is based on behavioral technology and reinforcement theory.

The behavioral viewpoint is based on the premise that behavior is shaped by its consequences and that these consequences eventually control the behavior. In order to bring about change, the practitioner rearranges the environment to cause the consequence to either inhibit or to increase responses. Reinforcement provides a satisfying consequence to a response. When the reinforcement is contingent upon a targeted response, the behavior is strengthened and its probability of recurrence is increased. Important considerations to the reinforcement theory include elements of:

1. Appropriateness of the reinforcer to the individual to insure that it has reinforcing value
2. Immediate delivery of the reinforcer following the desired response
3. Shaping the behavior, if the behavior is not presently a part of the student's behavioral repertoire, by reinforcing approximations of the behavior until the desired goal is reached
4. Designing a schedule of reinforcement to provide frequent rewards for a newly learned behavior, but
allowing for less frequent reinforcement as the behavior becomes stronger

5. Maintenance of the target behavior by an intermittent schedule of reinforcement, whereby the behavior is rewarded only occasionally

6. Modeling techniques demonstrated by a significant person who receives a desired consequence contingent upon the desired response.

Punishment, a part of the reinforcement theory, delivers an unsatisfactory consequence to a response and can be an effective way to change behavior, especially if paired with a reinforcement of the desired behavior. However, if punishment is severe or perceived as unjust by the learner, its use can produce undesirable side effects. Therefore, it is important to use positive reinforcement, when possible, and to use punishment only when it is paired with positive reinforcement of the desired behavior.

Specific sets of components have been suggested which comprise the systematic instruction model within this framework of behavioral theory. For example, Wong and Raulerson included the elements of:

1. Assessment
2. Behaviorally stated objectives
3. Data gathering about the subject matter and alternative processes of instruction
4. Well-defined learning tasks
5. Decision making concerning instructional processes and components
6. Activating the plan
7. Systematic data collection
8. Modification of instructional components and processes
9. Assessment of the system's effectiveness
10. Modification of the system, based on all sources of feedback, before it is activated again.

As a part of the Directive Teaching Instructional Management System, Stephens\textsuperscript{7} has identified the four steps of:

1. Assessment
2. Planning
3. Instruction
4. Evaluation.

Other authors have recommended theories for learning which are compatible with systematic instruction, but are not necessarily labeled as such. For example, Gagne described a hierarchy of learning which ranges from simplest to most complex.\textsuperscript{8} He hypothesized that this hierarchy exists in most areas and implied that the instructional sequence should proceed from the most basic prerequisite skills to the completed task.

Only one report was found which identified components of the systematic approach as it was used in music
instruction. Labuta discussed use of the systems approach for classroom music as it was adapted from the cybernetic cycle. Within this approach, he identified the following components:

1. Behavioral objectives to indicate what each student should be able to do at the end of instruction
2. Preassessment to ascertain what the student needs to learn
3. Instructional strategies and media to facilitate learning what is not known
4. A posttest to assess student progress and teaching effectiveness.

Labuta's book recommended the application of the systems approach to classroom music for the purpose of building accountability into the music program.

Some authors, while not identifying specific components which comprise systematic instruction, have discussed in depth a single component within the systematic design. For example, Colwell discussed systematic evaluation in music and listed three steps in the evaluation of music instruction for both private and classroom teaching:

1. Systematic collection of data
2. Interpretation of data
3. Dissemination of data.
Hofstetter used a competency-based approach to teach aural music interval identification skills.\(^1\) Eisenstein demonstrated that labeling of music symbols could be achieved by retarded students through the use of successive approximation procedures.\(^2\) Although labeling tasks gradually became more difficult, students in this study were able to increase accuracy from 10.67 percent during baseline to responses which ranged from 66.67 to 95.54 percent. Reinforcers of approval and light feedback were used for correct responses. Jetter designed an aural-visual identification instruction model (AVII), based on a systematic approach, to teach musical concepts to young children.\(^3\) Michel presented a system of filing and record keeping to assist music therapists in evaluation of progress for patients.\(^4\)

Many authors have recommended the use of a behavioral checklist to assess student learning. For example, Haring\(^5\) described the Uniform Performance Assessment System (UPAS), a computerized information system which uses the checklist form to measure progress of severe and profoundly handicapped students in four major skill areas. The level A section (birth to age 6) includes 247 items which are administered four times a year to measure self-help skills. Information from the assessment is used to plan instructional programs to teach deficient skills. Kauffman and Snell proposed that assessment areas need to
be identified and developmentally sequenced. Each specific behavior may then be subdivided into small teaching steps which are ordered from easiest to most difficult.

Although these sources discuss the concept of systematic instruction as it applies to music as well as to other instructional areas, it appears that no specific set of systematic instructional components has been identified and accepted universally by leaders in the fields of special education, academic education, music education, or piano pedagogy.

2.0 Description of DTIMS as Presented by Stephens

The Directive Teaching Instructional Management System (DTIMS) is a skill training approach which individualizes instruction for learning and behavior-disordered students, and provides an organizational system for teachers of handicapped children. It contains a curriculum for assessing and teaching arithmetic, reading, and social skills. The system includes suggestions for classroom management and for evaluating and tracking student performances. DTIMS is concerned with students' observed behaviors. After assessment, instruction is designed to correct defective performance. Any student response which has scored below a specified criterion level may be considered a relevant instructional objective; therefore,
instruction could be designed for any task in which the student is deficient. DTIMS consists of four basic steps: assessment, planning, instruction, and evaluation, and it offers assistance to classroom teachers in the following ways:

1. Specified performance objectives are suggested for areas of reading, arithmetic, and social skills

   Specified performance objectives, selected from a list of imperative skills in the areas of reading, arithmetic, and social behavior, were identified and targeted for instruction. Stephens defined imperative skills to be those which all children are expected to master in order to be successful in school. The imperative skills were identified through a survey of basic reading and arithmetic textbooks and were included in the imperative lists if they appeared in two or more sets of materials. Imperative social skills were established through a content analysis of 12 published behavior checklists, from which were chosen behaviors which can be observed in a school setting. A consensus of imperative social skills was then identified by a group of regular and special educators.

2. Criterion-referenced assessment tasks are suggested for each objective, keyed to commercial materials

   Assessment tasks provided teachers with specific
information about skills the student had mastered and those which the student had the prerequisite responses to learn. Within the DTIMS assessment, each task included a skill statement with 10 to 20 items for measuring the skill.

3. Performance criteria are suggested for each skill

A criterion score, given for each task, indicated the acceptable level for meeting the task requirements. Directions to teachers for presenting the task to students were included in the assessment.

4. Suggested teaching strategies are keyed to commercial materials which are known to be available to teachers

The teaching strategy or teaching plan provided teachers with a skill statement, modalities to use in teaching, and an indication as to whether the strategy was intended for an individual or a small group.

5. Reinforcement tactics are suggested for use in conjunction with instruction.

Suggestions for reinforcement tactics were included within the teaching strategy design.
A method for tracking student progress and reporting that progress to teachers, students, and parents is included in DTIMS. Obtained through the assessment procedure within this system is specific information about skills which are already mastered, those skills which students have the necessary prerequisite responses to learn, and those skills which they are not yet ready to learn. The assessment score will determine which of the following decisions will be made:

1. If criterion (mastery 90-100 percent) is met, a new higher-level assessment task is selected and assessment procedures are repeated.

2. If the score is at frustration level (below 70 percent), a lower-level assessment task is selected and assessment procedures are repeated.

3. If the score is within instructional range (70-90 percent), appropriate materials may be selected for instruction.

Results of the assessments are recorded on a Biweekly Update Form. Current information concerning instruction is recorded on the back of the form. Following the implementation of instructional strategies, students are reassessed, using the same assessment tasks. These performances are then recorded on the front of the form. If the criterion is met on reassessment, new skills are selected. If criterion is not met, teachers select a new
teaching strategy and continue instruction. DTIMS also includes an option for a computerized record keeping system in which information for each student is stored and updated, with a printout report of individual progress given to the teachers every other week. Teachers may also request a group profile. The group profile allows the teacher to identify students who need instruction on the same skill, facilitating group instruction of that skill.

The Directive Teaching Instructional Management System is a skill training program that allows individualized instruction and provides teachers with assessment and instructional plans, management suggestions, and a student reporting and tracking system. This system, based on direct observation and performance, has been used successfully to teach academic and social skills to handicapped students.

3.0 Adaptation of Systematic Instruction to Piano Instruction

Piano teachers have expressed the need for a practical system to teach students with special problems. For example, Hugdahl reported that in 1982 a survey from the University of Wisconsin Extension Music Department was sent to private piano teachers requesting information about their priority ratings for interests and needs in developing themselves professionally as teachers.18
Developing practice habits and motivating students were the two highest priorities reflected in this study. However, other examples of professional goals which private piano teachers mentioned included such needs as:

1. Ability to provide goals for students
2. Compassion and patience for the very slow student
3. More understanding of learning ability and disability of the individual student
4. More knowledge about physical limits of young children.

Piano teachers could benefit from the application of a systematic approach to piano instruction in all four of these areas.

Cameron, in a discussion of teaching piano to handicapped students, suggested that music is clearly a measurable skill. She says, "Music is a measurable skill, in that one can actually compare the zero when one started to the number of pages one has learned." Horn proposed that even performance opportunities can be ordered systematically. In her article, she reported her experience of integrating an autistic child into performance activities which ranged from a private recital for the child's grandmother to participation in the Federation of Music Clubs Festival.

Most basic skills of piano performance can be arranged in sequential order, described in behavioral terms, and
measured by direct observation. Therefore, it would appear that the systematic instructional model could be adapted to the area of teaching piano skills to handicapped students.

In the present study, the four steps of assessment, planning, instruction, and evaluation, selected from the DTIMS assessment by Stephens, were chosen as components for the adaptation of the systematic model to piano instruction. It was believed that these four steps embodied the most important aspects of the systematic approach, that they would be easy to adapt to piano instruction, and that they would be understandable to piano teachers who have had no specific training in special education. These components were adapted as follows:

1. Assessment

This component included information about the history and past performance of the piano student, any testing results, medical information, and school placement information which could be shared by the parent. Initial assessment of prerequisite skills and/or existing piano performance skills which the student demonstrated was also included in this step.

2. Planning

By adapting the format of the Individualized Educational Plan (I. E. P.) which is used for educational programming in Special Education, the piano student's long term goals and short term
objectives were written in behavioral terms, based on the results of the initial assessment.

3. Instruction

A program of instruction was then designed and instituted for the purpose of teaching the targeted skills. The plan used behavioral techniques such as task analysis and programs of reinforcement. A careful collection of data at weekly lessons measured student progress and facilitated evaluation of the instructional program.

4. Evaluation

Weekly evaluation occurred as data points were graphed at lessons. Student progress was evaluated informally at the end of autumn, winter, and spring quarters. At the end of the summer quarter, a formal evaluation of the entire year's achievements was completed and the student's progress was charted. Based on this information, new objectives were then set for the following year.

4.0 Organization Within a Private Studio Setting

For the present study, 15 handicapped students were scheduled for piano lessons within the teaching schedule of an experienced private piano teacher. Types of student handicaps included mild and moderate mental retardation, visual impairments, learning disabilities, physical
handicaps, behavioral handicaps, auditory perceptual problems, language and speech problems, and autism. No attempt was made to group handicapped students together on a particular day or to intersperse them in any particular order with nonhandicapped students. Lessons of 30-, 45-, or 60-minute intervals were chosen for each student with parental approval. The recommended lesson length was determined by the age of the student, the number of years in piano study, and the difficulty of repertoire. Of the 15 handicapped students, 11 were scheduled for 30-minute lessons and four were scheduled for 45-minute lessons. No handicapped students were scheduled for 60-minute lessons.

Instructions to parents concerning practice supervision were similar for handicapped and nonhandicapped students. All students within the studio received practice instructions written in an assignment notebook, and all parents were encouraged throughout the year to communicate with the teacher by means of written correspondence or telephone calls. Parent-teacher conferences were scheduled when needed. At times a standard cassette tape was used to supplement instructions and to provide an auditory model. Parents of all students were given the option of observing lessons if they wished.
4.1 The Flow Chart

The process of instruction was based upon a lattice of six instructional areas which included:

1. Improvisation/Harmonization
2. Technique
3. Reading/Adapted Reading
4. Rhythm
5. Theory
6. Repertoire/Performance

The instructional process is represented by a flow chart in Figure 1.
Figure 1. FLOW CHART
Within the assessment process, the teacher could choose to measure any number of instructional areas, either singularly or concurrently, although most beginning students would be assessed concurrently in all six areas.

The option to assess only one or two areas was available for special needs; for example, assessing a student who demonstrates strength in all but one or two areas; for a very slow student requiring intensive instruction in a single area; and, for a transfer student who might be progressing at an appropriate level in most areas, but had not yet been introduced to a particular area such as Improvisation/Harmonization. This option also provided opportunity for the teacher to become skilled gradually in the assessment process, an asset for piano teachers who are unfamiliar with assessment procedures.

The teacher could choose to assess only one area at a time, providing experience in learning to incorporate the separate techniques of instruction, observation, evaluation, giving verbal reinforcement, and recording data into an acquired, composite skill.

Each handicapped student in the present study was assessed in all six areas concurrently by using the following method:

Each student was either observed informally or tested specifically as the first assessment step of the identified instructional area was presented. If the student responded
within the prespecified criterion limits for the task during the first trial, the teacher immediately presented the next step for assessment.

Criterion limits ranged from 100 percent accuracy required to complete a single task, such as discriminating between groups of two and three black keys, to a measurement-of-correct response/Errors system used for more complex tasks. An example of a complex task included performing a one-octave scale with hands together, ascending and descending. Criterion limits for this task might consist of the scale being performed with two or less note and/or fingering errors within two trials. When possible, criterion limits were set for number of correct responses rather than measurement of errors. Naming notational flash cards within an established criterion of 23 out of 24 correct responses within a 60-second time limit is an example of counting correct responses rather than errors. The observation of errors/correct responses was used for measurement of mastery rather than the standard 90-100 percent criterion limit to facilitate data collection without mathematical calculation during the lesson.

The assessment process continued during lessons until a task was presented which could not be completed within the pre-established criterion limits. At that point, the teacher designed an instructional plan which included
appropriate short term objectives to teach the step. During the instructional phase, regular data collection provided a record of progress, and instructional mastery of each targeted objective was determined when the student completed the task three consecutive times within the specified conditions and criteria.

If mastery of a short term objective during the instructional period had not occurred within a "reasonable" period of time, either the step was task analyzed or a new plan of instruction was designed. In the present study, a "reasonable" period of time was determined on the basis of subjective teacher judgement, since no decision rule was established to determine when task analysis or a new plan of instruction should begin.

After instruction, the student was reassessed by presenting the original task which had not yet been mastered. Upon successful completion, the student moved to the next assessment step. If, however, the task specifications were not met, a different plan of instruction was designed and the instructional phase was resumed. The process continued until the student had completed the most difficult step of each targeted area.

4.2 The Instructional Areas

Six instructional areas were chosen for use in the present study. Selection of areas was based on two
decision rules:

1. Instructional areas are suggested by well-known curriculum writers in the field.

2. Instructional areas are needed to insure successful development of functional piano skills for students who have limited cognitive abilities and/or other serious handicapping conditions.

A chart was developed for the present study which listed the lattice steps of each instructional area. The chart was used both as an assessment guide and as a progress chart. Results of assessments were recorded on the progress chart at the end of summer quarter, reflecting student progress which had been made in each instructional area during the year. The chart, Milestones in Piano Skill Development for Handicapped Persons (MPSDHP), may be seen in Figure 2.
<table>
<thead>
<tr>
<th>Establish Improvisation Skills</th>
<th>Establish Technical Reading Skills</th>
<th>Establish Reading Skills</th>
<th>Establish Theory Concepts</th>
<th>Establish Repertoire Performance Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play a Complete Improvised Song With Harmony</td>
<td>Read Notated Melodies in Major, Harmonize With Single Line/Chord Harmony</td>
<td>Read Notated Melodies in Major, Harmonize With Single Line/Chord Harmony</td>
<td>Respond Correctly To Major Melodies in Major, Harmonize With Single Line/Chord Harmony</td>
<td>[LEVEL E] Many Persons In A Variety Of Settings, Acceptance, Expression, And Played From Memory</td>
</tr>
<tr>
<td>Add Introduction</td>
<td>Root Position</td>
<td>2-Octave Arpeggios In Parallel Motion</td>
<td>Play Melodies With 1-Oct Chords</td>
<td>Vascularize Meaning Of Simple Dynamics And Tempo Markings</td>
</tr>
<tr>
<td>Add &quot;Millions&quot; And Improvised Variations</td>
<td>Play 5-Finger Melodies With 1-Oct Chords Harmony</td>
<td>Play Notated Melodies With 1-Oct Chords</td>
<td>Include 1-Oct IV, V, VI In Visual Identification</td>
<td></td>
</tr>
<tr>
<td>Improvisation Or Spontaneous Composition</td>
<td>Recognize Melodies With Inversions</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Recognize Key Signatures Of Familiar Keys</td>
<td></td>
</tr>
<tr>
<td>Play By Ear In 2-Octave Scale</td>
<td>Play Major/Minor Scales And Inversions</td>
<td>Identify 1-Oct By Staff Placement Or Adapted System</td>
<td>Identify And Perform Corresponding Rhythm</td>
<td></td>
</tr>
<tr>
<td>Transpose To Major And Minor Keys</td>
<td>Transpose Melodies To G</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
<tr>
<td>Harmonize With 2-Octave Chords</td>
<td>Transpose Melodies To B</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
<tr>
<td>Add A Variety Of Accompaniment Forms</td>
<td>Play 5-Finger Melodies In C</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
<tr>
<td>Harmonize With Modified 2-Octave</td>
<td>Play 2-Octave Scale Up And Down</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
<tr>
<td>Harmonize With Simple Tune By Ear</td>
<td>Use Legato And Staccato Touches</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
<tr>
<td>Create Short Phrase Story Songs</td>
<td>Select Either Traditional Reading Mode Or Adapted To Directional Reading</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
<tr>
<td>Question/Answer Improvisation</td>
<td>Add Skips To Directional Reading</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
<tr>
<td>Listening And Imitation Skills</td>
<td>Directional Reading Using Steps And Repeated Notes</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
<tr>
<td>Keyboard Geography</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
<tr>
<td>Entry Level Skill</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td>Identify Intervals 1-5 By Staff Placement Or Adapted System</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2: MILESTONES IN PIANO SKILL DEVELOPMENT FOR HANDICAPPED PERSONS
Commercial piano method materials provided a model for the selection of the six instructional areas chosen for the MPSDHP in the present study. Most published curriculum sources include a basic instruction book which introduces sequenced music concepts, reading skills, rhythm concepts, and performance skills. Supplementary instruction is usually provided in at least three traditional areas including technique, repertoire, and theory. Many current sources also advocate the inclusion of practical performance skills, such as improvisation, transposition, and harmonization as well as the traditional instructional areas.

For the current study, the traditional areas of Technique, Reading, Repertoire/Performance, and Theory as well as the practical skills of Improvisation/Harmonization were included as specific instructional areas. The area of Rhythm was also designated as a separate instructional area for the current study. Transposition was not designated as an individual area of instruction, but it was included within the context of three other instructional areas.

In the present study, the two areas of Reading/Adapted Reading and Rhythm were designated as areas of particular importance. Staff note recognition is often difficult for piano students, even for those who have no handicaps. For the student with learning disorders, perceptual problems, or limited intellectual potential, music reading is likely
to present very unique and troublesome difficulties. The systematic approach which is presented in the Traditional Notation column of Establishing Reading Skills provides a sequential outline of tasks needed to achieve reading skills. A task analysis of each task provides small increments of progress which can be documented as mastered before the next step is introduced.

Some handicapped students are unable to read traditional notation. These students require adapted reading modes to enable them to convert the printed mode into music. The Adapted Notation column enables a choice of adapted reading modes to be made based on the student's area of strength in discrimination of visual symbols, such as numbers, alphabet letters, or colors.

For some students, printed notation of any kind will be ineffectual. These students can progress through the same basic structure as readers who use adapted modes, but instruction will be quite different. Individualized programs are required to teach these students to hear and respond, enabling them to also demonstrate performance skills. Development of memory skills may constitute a separate area of instruction for students who cannot rely on printed notation for recall. The establishment of appropriate memory prompts, such as color-coded visual aids or verbal reminders, may be necessary to help these students retrieve the melodies which have been learned.
Rhythm concepts and performance of rhythmic tasks often present unusual difficulties for many handicapped students. For example, limited fine motor control may inhibit the physical demonstration of correct rhythm. Some students may require special instruction in comprehension of the mathematical element of rhythmic notation. A few will respond appropriately only after intensive training in imitation skills. A separate category of Rhythm was included in the MPSDHP to insure the careful planning of instructional methods to teach rhythm skills and concepts.

The traditional area of Repertoire was combined with Performance in the present study. Although performance opportunities must be organized appropriately and sequentially to insure successful experiences for any student, such planning is especially important for students with handicaps. Carefully planned studio performance events can provide normalizing experiences for even the most severely handicapped student. The sensitive teacher will provide creative performance opportunities for each student in the studio to facilitate a philosophy which values shared talents and skills as a student's musical gift to others.

No published list of sequential steps in piano skills was found in the literature. Thus, decisions were made about the sequential organization of lattice steps in the MPSDHP based on requirements presented in the Piano Guild
Syllabus, from technical requirements (unpublished) for entry into Scale Olympics from the Ohio Music Teachers' Association, from an informal synthesis of concepts presented in three curriculum sources of piano instructional materials for beginning students, and from the investigator's 30 years of experience as a private piano teacher.

4.3 The Studio

The piano studio was located within the teacher's home on a level isolated from the living portion of the house. A waiting area, separate from the studio, was designated for parents and siblings, although parents could observe lessons if they wished. The studio housed two upright pianos and one electronic keyboard, and a grand piano was located in a different area of the home. A file cabinet containing students' folders was within reach of the teacher. Graph booklets for recording data were arranged on a bulletin board also accessible to the teacher. Teaching tools within the studio consisted of typical music supplies and teaching materials which were used for all students. The studio teaching year was divided into autumn, winter, spring, and summer quarters, each quarter consisting of 11 weekly lessons. Lesson content consisted of study in all six instructional areas.
4.4 The Organizational Process

Within the studio, students would arrive and leave in 30- to 60-minute time segments with no time between lessons to review progress or plan for the next student. Therefore, targeted areas of instruction, as well as current progress in that area, must be readily available and easy to find. Also needed was a data collection system which would be accurate, would show progress and mastery at a glance, and would take minimal outside-of-lesson time to analyze for mastery.

4.4.1 Assessment Procedures

4.4.1.1 The Folder

A standard office file folder, containing a prospective individualized instructional plan for the year, was designated for each student within the studio. Folders used for handicapped students were identical in outside appearance to those of nonhandicapped students. The contents of the folder used for handicapped students, however, organized the systematic instructional procedure which was used for the study.

Six pages, one each for Technique, Theory, Rhythm, Improvisation/Harmonization, Reading/Adapted Reading Skills, and Repertoire/Performance, were stapled to the inside cover of the folder and formed the Individualized Music Educational Plan (I.M.E.P.)
for the student. The format of the I. M. E. P. may be seen in Appendix A.

Student absences were recorded at the top of the I. M. E. P. Important information was emphasized by red stick-on arrows, and small stick-on memo pages were placed on the appropriate page, when needed, as a reminder to the teacher to order new materials or to think through a problem area. Parent correspondence and school records/assessments were attached to the folder for reference. A progress chart (Milestones in Piano Skill Development for Handicapped Persons) was stapled to the back cover of the folder. Colored felt-tipped markers were used to record summarized data on the progress chart, with a specific color designated to reflect each year of piano lessons. Music purchased and intended for future instruction was kept inside the folder until needed.

4.4111 Background Information

The folder for handicapped students included background history which was shared by a parent at an initial interview. An Interview Guidelines Form, designed to record information from the initial parent interview, may be seen in Appendix B. Examples of descriptive information, requested from the parent and later recorded in the folder,
included reports of psychological and achievement tests, medical diagnosis of the handicap, student limitations, allergies, reactions to medication, a copy of the student's I. E. P. (when available), potential reinforcers, and parental expectations and goals for the student's piano study.

Pertinent facts, such as allergies and medications were displayed at the top of the student's folder to prevent accidental mismanagement. For example, the words "NO SUGAR" would be highlighted by a red arrow in the case of a diabetic student, because the selection of a food item reinforcer containing sugar should not be used for a student with diabetes. Other information at the top of the chart included the student's age, number of lesson absences during each quarter, level of achievement in school, years of piano study, proposed performance opportunities, and performance level. This information would assist the teacher in selecting materials which were age-appropriate and yet within the limits of the student's developmental level.

4.4112 Long Term Goals

Long term goals were tentatively made to guide the initial choice of curriculum. To
illustrate, the long term goal for a student whose academic reading and arithmetic levels were reported to be at a first grade level or beyond would include the use of traditional music notation. If, however, a student functioned below first grade level, he was assessed for his ability to distinguish between alphabet letters, numbers, or colors, any of which could be used as alternative notational modes. This student's long term goal would include use of rote learning and/or adaptive reading skills which used the strongest of the three alternative modes rather than traditional notation. If a student was unable to use any of the three adapted reading mode choices, he was taught by rote and/or conditioned response until a strong mode could be established.

4.4113 Current Level of Function

Within the first few weeks of piano lessons, each student was assessed in each of the six instructional areas in order to determine either readiness for learning by the mastery of prerequisite skills, or the student's current functioning level.
4.412 Booklet of Graphs

An individualized booklet of graphs supplemented each student folder. The graph pages were organized into categories of instructional areas, collected on a metal ring, and hung on bulletin board pegs for easy access. A current short term objective was listed at the top of each page of the booklet (Refer to Figure 3).
Jim will name 12 out of 14 notes in 3 out of 3 consecutive trials. The first verbalization heard will constitute a response.

Figure 3. BOOKLET OF GRAPHS
The booklet of graphs was used during each lesson to collect data for each programmed objective. For example, as the performance of an objective was observed at the lesson, data could be graphed and immediately summarized for mastery. When mastery of an objective occurred after instruction, the three consecutive data points were highlighted with a colored marker, and a gold stick-on dot was placed at the top of the graph. The color used to highlight the data points represented a specific quarter of lessons; for example, yellow for autumn quarter, pink for winter quarter, green for spring quarter, and blue for summer quarter. After mastery of an objective, the graph page was repositioned into a section of the booklet targeted for post check assessments. Objectives for which mastery had not yet been reached were identified by a red stick-on dot at the top of the graph, and were retained in the booklet section which was used weekly for instruction and assessment at lessons.

Another section of the booklet included new graphs prepared for subsequent steps of each objective which could be inserted into the section reserved for current instruction when needed. The graph booklets were designed to be prepared at the beginning of a teaching year and would include all
objectives which were planned for the entire year. At the end of each quarter, the graph booklets were evaluated informally and reorganized to insure that progress was occurring consistently in all areas. Although the graph booklet was not kept inside the folder, it was an integral part of the folder and a critical part of the assessment procedure.

4.42 Planning Procedures

After determining the current functioning level of the student, the next objective within a subcategory of each instructional area of the MPSDHP was targeted to be taught. Objectives were written on each student's I. M. E. P. encompassing all six instructional areas. The individual design of each teaching/learning plan included:

1. Targeted objectives which were defined clearly and which could be measured by observation of student response
2. A task analysis of targeted skills, when necessary
3. Identification of the student's primary learning mode
4. Careful selection of a high-quality, currently published music curriculum for presentation of concepts and skills.
4.421 Instructional Objectives

Writing annual instructional objectives in behavioral terms on the student's I. M. E. P. was of critical importance in the current study. Each objective included the following components:

1. The student's name
2. The targeted skill described in precise terms
3. The conditions under which the step must be performed
4. The criterion for mastery.

The following example illustrates the format which was used to write instructional objectives for each student: "When presented with standard staff notation flashcards, Mary will name and play in the proper octave position of the keyboard seven out of ten notes in three out of three consecutive trials. The first verbalization of note name and the first sound heard when played on the keyboard will constitute a response." The I. M. E. P. was prepared during the first quarter of the student's piano study and included objectives projected to be taught for the entire year.

4.422 Task Analysis

Many authors have recommended a sequential approach to learning, the success of which has been documented in the literature. Bruner's
presentation of a Spiral Curriculum and Gagne's hierarchical approach both show the benefits of instruction which is presented in a logical and stepwise fashion. Most current piano curriculum sources present concepts and skills in a sequential order, similar to Bruner's approach to learning. For many handicapped students, however, the sequences in typical curriculum sources are too broad, and not enough practice is devoted to each step to allow that skill to be learned. For these students, each sequence must be broken into smaller steps with additional opportunity to practice each segment for mastery. Upon completion of this chain of steps, the entire task can then be performed.

In the field of Special Education, many examples of task-analyzed areas of vocational and self-care skills have been published. For example, Gold, a leader in this area, suggested 14 steps within the task of winding a bobbin of a sewing machine. Recently, a few examples of a step-by-step approach within specific music skills have been published such as "Mastering keyboard improvisation: Progressing through a sequence of specific objectives" by Blum. Sequences in some performance areas, although not written in a traditional task analysis form, have been suggested to assist piano
teachers and adjudicators in preparing and grading students who appear in competitions and auditions. Piano Guild, for example, presents a sequence of skills, ordered by degree of difficulty, in the Suggested Musicianship Phases Chart and the Program Requirements Suggested Literature Chart.  

In the present study, the MPSDHP provided a lattice of piano skills in a sequential order (subcategories) to provide an orderly structure within which a private piano teacher could plan instructional programs to teach handicapped students. Many handicapped students, however, needed smaller steps of instruction for each step of the lattice. For these students, an additional task analysis of skills was required. An example of an individualized task analysis of subcategories is shown in Figure 4.
IMPROVISATION/HARMONIZATION

1. KEYBOARD GEOGRAPHY

1.1 Verbal identification
1.2 Identify by playing on the keyboard
   1.21 Three black key groups
   1.22 Two black key groups
   1.23 High, middle, and low positions on the keyboard
   1.24 Notes that go up, down, or stay the same
   1.25 Locate a b c d e f g in different keyboard positions

2. LISTENING AND IMITATION SKILLS

2.1 Match pitches on keyboard
   2.11 One note
   2.12 Two notes--up or down
   2.13 Three notes
      2.131 Stay the same (repeated notes)
      2.132 Going up or down in steps (2nds)
      2.133 Introduce skips (3rds)
      2.134 Going up or down using a combination of steps and skips (2nds and 3rds)
      2.135 Use combinations of learned intervals and direction

3. QUESTION/ANSWER IMPROVISATION

3.1 Imitate a 2-note question, then a 2-note answer (turntaking)
3.2 Verbally identify the question as notes go up and the answer as notes go down
3.3 Imitate a 2-note question/answer
3.4 Play a 2-note answer to a question
3.5 Play a 2-note question/answer
3.6 Play a 4-note answer to a question
3.7 Play a 4-note question/answer
3.8 Play a 2-measure answer to a question
3.9 Play a 2-measure question/answer
   3.91 Parallel answer
   3.92 Contrasting answer

Figure 4: AN EXAMPLE OF A TASK ANALYSIS OF SUBCATEGORIES
For the present study, printed sources were used, when available, as a basis for the task analysis process often needed for handicapped students. When no authority could be found, the teacher divided the task into steps by performing the task mentally in "slow motion," analyzing each movement upon which the next movement depended. Then, by performing the task physically, the teacher was able to arrange each step into a sequential progression for completion of the entire task. The analysis differed at times from student to student, depending on individual learning patterns as well as the degree and type of handicap.

4.423 Primary Learning Modes

Curwen described music students as belonging to one of the three "sense" types: visual, audile, or tactile. She stated that the visual student tends to use visual imagery, the audile, the auditory sense, and the tactile student uses kinesthetic imagery. In 1981, Azarowicz described tactile, aural, and visual learners, and offered examples of practical tests she used to assess a primary learning mode.

For the current study, a student's primary learning mode was determined informally by observing learner response when asked to spell a word. If the
eyes moved upward as though to "see" the letters in the mind, the student was assessed as visual. If the lips moved as though to "sound out the syllables", the student was assessed as auditory. If the hand moved as though to write out the word, the student was assessed as tactile.

If academic skills were very limited so that a spelling task was not feasible, an observation-of-performance task was used. The student was observed very carefully as a previously learned song was performed. If the student watched the adapted notation with intensity, a visual learning mode was recorded. If the song was performed by searching for the correct note by the sound rather than finding notes by using the adapted notation, the student was assessed to be auditory. If attention was focused on the keyboard or the fingers with little attention paid either to the adapted notation or to correcting mistakes auditorily, the student was assessed as tactile.

Sometimes it appeared that a student used two learning modes equally. In this event the dual mode was recorded, such as "visual-auditory" or "auditory-kinesthetic". In some cases the specific handicap dictated the learning mode. A blind student, for example, would tend to use either the
auditory or tactile mode, or both in combination, since his visual sense was impaired or nonexistent.

This informal assessment of learning modality, while not documented as accurate, was used in the current study to assist in planning instructional procedures which would use the student's probable strongest learning modality.

4.424 Choice of Curriculum

No single, published curriculum series was used in the current study. Rather, the curriculum source was selected according to the following guidelines:

1. A prereading source must be selected for students with limited academic reading skills, whereas students with reading skills already developed would be given a typical beginner's series

2. Notation for reading students must be written in large, clear print with a minimum of distractibility factors such as clashing colors or multiple comments by the editor

3. Experience must be given in the use of directional reading prior to notational reading, and the student must learn early songs by use of black key groups (pentatonic) before progressing to white key positions

4. Many of the early songs presented must be
familiar (such as folk songs)
5. Opportunities for the student to transpose, improvise, and harmonize melodies must be included, although if a series omitted these areas, they were supplemented by the teacher
6. Songs must be pleasing to hear, with early use of simple harmony (such as triads or intervals in one hand and melody in the other).

4.43 Instructional Procedures

The instructional phase has been termed "Intentional Teaching" (I.T.) in the present study. Based on the results of the assessment and planning stages, an individually designed plan for instruction had been chosen, criteria for mastery had been determined, and rewards had been identified before instruction began. Factors which helped to determine the success or failure of instruction included:

1. The selection of supplementary materials which were musically pleasing, age-appropriate, yet within the instructional level of the student for sufficient practice of concepts and skills
2. Adaptation of materials and creative design of supplementary devices to compensate for existing handicaps of the student
3. Appropriate choice of rewards.
4.431 Choice of Supplementary Materials

For many handicapped students, a typical curriculum series progresses too rapidly for concepts and skills to be learned in depth. In the present study all but two handicapped students required a wide range of supplementary materials to provide necessary practice for each new concept. Factors which were considered in the choice of this additional music were similar to the ones used in choosing the student's original curriculum. In addition, these requirements were considered to be important:

1. Method of presentation of a concept must not be conflicting with the primary curriculum source. For example, if a student's primary curriculum taught notational reading by identifying intervals rather than identifying individual notes, the supplementary books should support the same method of instruction.

2. The difficulty level should be the same as or easier than the primary curriculum series so that the student would experience practice in previously learned skills rather than introducing new skills.

3. The illustrations and presentation of concepts must be appropriate to the age of the student;
for example, titles of songs as well as illustrations must be appropriate to the chronological age rather than developmental age of the student.

4. Specific songs were evaluated individually as to their functional value to the student, and songs which would bring the student admiration from family and peers were given higher priority for instruction than songs which were less likely to be enjoyed by the student's environmental group of listeners.

4.432 Adaptation of Materials

Materials which were appropriate for instructional purposes often were inappropriate for a particular student without some kind of adaptation. The type of adaptation required would depend on the type and degree of severity of the student's handicap. Types of adaptations which were frequently necessary included:

1. Adaptation of notational style
2. Refingering or eliminating some notes because of limited motor skills
3. Simplification of particular songs requested by the student but which were not available in good, easy arrangements
4. Changes of melody from one clef to the other
because of limited function in one hand

5. Use of supplementary devices designed for a special purpose, such as:
   a. Cards to block out distracting notes in prior and ongoing measures
   b. Use of colored stick-on dots indicating the use of right or left hand to play notes in the corresponding clef
   c. Use of objects to play notes or note clusters for students with limited hand function.

4.433 Choice of Rewards

Reinforcers were an important part of the current study for all students within the studio, but were especially important for handicapped students. Music is reinforcing in itself, so that hearing the sound often provided the only necessary reinforcement for learning a new skill. For many students, seeing progress reflected on the graph which was being used at lessons was an effective reinforcer. For other students, it was necessary to plan a program of reinforcement for a particular program objective. Selection of reinforcers was based upon teacher observation of activities and items which were enjoyable to the student as well as items suggested by both parents and students. When possible, praise
and positive feedback for correct responses was the reinforcer of choice. Artificial reinforcers were always paired with praise so that, eventually, the artificial reinforcer could be gradually reduced (faded), then given only intermittently, and finally eliminated.

4.44 Evaluation Procedures

Evaluation procedures were an ongoing process throughout each part of the current study. Although the evaluation procedures have been discussed as a part of the entire organizational process, they can be summarized into four evaluation levels:

1. Initial evaluation, which involved parental input as well as assessment of the current functioning level of the student

2. Ongoing and continuous evaluation during weekly lessons with regular data collection in the graph booklet

3. Informal evaluation for mastery of objectives at the end of autumn, winter, and spring quarters

4. An annual evaluation at the end of the summer quarter which included recording the student's progress for the year on the progress chart in the folder.

The results of the annual evaluation determined the selection of new objectives for the following year.
A sample four-week series of simulated piano lessons to illustrate the use of the adapted systematic instruction model to teach a handicapped student may be seen in Appendix D.

References


7. Stephens, p. 252.


23. Ohio Music Teachers' Association, "OMTA scale olympics 1986," registration form for Central Eastern District event (Xeroxed), Columbus, Oh., 1 November 1986.


CHAPTER IV
ANALYSIS AND DISCUSSION

Introduction

The problem for the current study concerned adaptation of systematic instruction to teach piano skills to handicapped students. Seven questions were addressed by the study:

1. Is the systematic instruction model an appropriate system for teaching keyboard skills to students with handicaps?

2. How can the systematic instruction model be adapted to teach keyboard skills?

3. Is there a developmental order to the presentation of keyboard skills?

4. Is it possible to develop measurable objectives from a developmental sequence of piano instruction steps?

5. Is such a system practical for use in a typical independent piano studio setting?

6. How can individual student progress be monitored from week to week in such a setting?

7. Is it realistic to propose that such a system be
used by piano teachers who do not have specialized training in special education?

Each of these questions will be discussed individually within this chapter. Changes which were incorporated into the instructional format during the present study will be included in the discussion.

Analysis and Discussion of Questions

1. Is the Systematic Instruction Model an Appropriate System for Teaching Keyboard Skills to Students with Handicaps?

The systematic instruction model has been documented in numerous sources as an effective instructional system for teaching both academic and nonacademic skills to the handicapped population. Recently some questions have been raised concerning the effectiveness of individualized programs for special learners which have been developed by using an aptitude treatment interaction approach (ATI). The ATI approach supports development or selection of individualized educational programs based on a prior assessment of learner characteristics or aptitudes. Lloyd suggested that such an approach is inadequate for the design of individualized instructional programs because it results in inadequate achievement for special education students. This report tends to cast doubt on the
appropriateness of some elements of systematic instruction for adaptability to other fields.

Systematic formative evaluation is a contrasting approach to the development of individualized educational programs. Systematic formative evaluation differs from ATI since it emphasizes ongoing evaluation of student progress with subsequent program modification when indicated by the data.\(^3\) Fuchs and Fuchs conducted a meta-analysis of studies exploring the effects of systematic formative evaluation of educational programs on academic achievement.\(^4\) Results of the study indicated that "the use of systematic formative evaluation procedures, within a group of studies that employed predominantly mildly handicapped subjects, significantly increased students' school achievement, both statistically and practically." They suggested that although the process was time consuming, the benefits warranted implementation. Other factors, reported in the study, contributed to effective learning:

1. Systematic and frequent monitoring of educational programs, with program modification based on the analysis of the data within the guidelines of specific rules
2. Use of behavior modification
3. Graphed data displays.\(^5\)

Fuchs and Fuchs reported that data evaluation rules
required teachers to use explicit, systematic procedures to evaluate the data which had been collected at regular intervals. \(^6\) Program changes were introduced only if the data suggested certain patterns, rather than making changes as a result of teacher judgment of data evaluation.

The success of the current investigation may be due, in part, to the inclusion of the following elements of the systematic formative evaluation approach, within the systematic instruction model, to teach keyboard skills to students with handicaps:

1. Early program development was based on an initial assessment of existing skills and prerequisite skills rather than upon learner characteristics. Although piano teachers are encouraged to interview prospective students and parents as to prior musical experience and future goals before instruction begins, formal assessment of the student's intellectual capacity and learning styles is not encouraged. Results of professionally administered tests are often included in school records, but usually these are not accessible to independent studio teachers. Therefore, the systematic formative evaluation approach, reported to be the more effective of the two approaches, was also the most feasible approach to use for the present study.

2. Skill development in specific areas was assessed
systematically at the student's weekly lesson. Ongoing evaluation of data occurred weekly as data points were graphed at lessons. Informal evaluation occurred at the end of each quarter, and an annual evaluation took place at the end of summer quarter when plans were made for the next instructional year.

3. Both behavior modification techniques and graphed data displays were used in the present study. Reinforcement conditions were designated within the student's program plan, and the student's graph booklet made possible immediate graphing during data collection.

4. Program modification was based on analysis of the data within the guidelines of specific rules. Mastery of a skill was defined by specific rules which indicated necessary criteria and conditions. Program changes were made when instruction failed to produce the levels of skills needed to reach mastery as it was described. Precise evaluation rules would have made the study even stronger. Suggestions for rule content would include program modification based upon a maximum length of time required for mastery and upon defined patterns which were noted in data evaluation.
2. How Can the Systematic Instruction Model be Adapted to Teach Keyboard Skills?

A description of this adaptation process can be found in Chapter III of the present study.

3. Is There a Developmental Order to the Presentation of Keyboard Skills?

A few efforts have been made to systematize levels of music skills in selected areas. For example, Sharretts\(^7\) identified a task analysis of rhythmic reading based on Gagne's learning theory and Ching\(^8\) presented an order of presentation of technical skills for piano students which consists of very small steps, similar to a task analysis. Recently, Froemke\(^9\) recommended a systematic approach to the introduction of technical skills to piano students, and developed a list of technical skills, arranged in sequential order, which she used in her studio. Other examples were cited in Chapter II of the present study. However, the lack of an organized system of music skills which is generally accepted by music educators appears to be one stumbling block to the use of systematic instruction in music programs for both typical and handicapped children.

Thompson stated that the music profession does not have a sequential content which is standardized for general music levels of basic skills, making it difficult to assess
the functional level of handicapped students in classroom music.\textsuperscript{10} Hedden reported that he had found few formal attempts to construct a graded continuum for evaluating the difficulty level of musical aspects within a piece of music, and that he had found no research study in music education which had evaluated a hierarchical strategy for teaching performance skills.\textsuperscript{11} Music educators who teach handicapped students are hindered seriously in their attempts to plan appropriate programs of study which will begin instruction at a rudimentary level of prerequisite skills, present new concepts in very small steps, provide adequate practice for each step, and document slow progress leading to mastery of a skill.

In the current study, six areas of piano study were targeted for instruction. A chart, Milestones in Piano Skill Development for Handicapped Persons (MPSDHP), provided a teacher-prepared lattice of piano skills (subcategories), arranged in developmental order, within each of the six instructional areas. This chart served adequately both as an assessment guide and as a progress chart for the present study. It provided a structure within which the teacher could determine individually designed objectives and record observed progress. A task analysis of the subcategories made possible the presentation of smaller instructional steps when needed.
The MPSDHP, designed specifically for the present study, may or may not be adequate for other teachers. Most commercial piano curriculum sources present music concepts and technical skills in sequential order, but the exact order varies from author to author. The studio teacher may need to revise the lattice to follow the particular curriculum source which has been selected for instruction.

Task analysis provides further breakdown of developmental steps. In the present investigation, instructional subcategories were further subdivided (task analyzed) when an area presented special difficulties for a student. Many students required a task analysis for every subcategory step. During the present study, difficult areas were task analyzed as needed, then printed by hand on the student's Individualized Music Educational Program (I. M. E. P.). Corresponding pages within the graph booklet were added or revised so that each small step could be assessed during lessons. Although requiring extra preparation time, this process resulted in more efficient instruction. Xeroxing examples of difficult keyboard skills on to individual I. M. E. P. pages would reduce the amount of out-of-lesson-time now required in the present design. The teacher could select appropriate pages for insertion into the student's I. M. E. P. as needed without writing the steps by hand.
In the current study, it was at first assumed that a formal assessment would be necessary to measure accurately the task sequences of a particular skill. An initial attempt was made to design a format for constructing a keyboard skills assessment. A branching system, modeled from a procedure developed by Stephens, was used to construct the assessment. In this branching arrangement, the subcategories of the original six instructional areas were arranged into a task sequence (lattice). Subcategories were selected based on the following decision rules:

1. Subcategory choices are contained within well-known, commercial curriculum sources
2. The subcategories are required for many performance auditions and contests such as those offered by Piano Guild Auditions, Ohio Music Teachers' Association (OMTA) competitions and performances, Ohio Music Educators' Association (OMEA) Solo and Ensemble Contest, and college entrance auditions
3. Based on teacher experience and upon the recommendations of other respected music resource persons, the subcategories are essential to the complete musical and technical development of typical piano students

The building process consisted of the following steps:

1. Based on two decision rules which were discussed in
section 4.2 of Chapter III, areas of traditional piano instruction were divided into a classification system of the six instructional areas which were used for the present investigation

2. A flow chart was designed to show the structure and operational system of the assessment (See Figure 1 in Chapter III)

3. Instructional areas were then divided into subcategories and each level was catalogued by using numbering cues

4. To complete the branching arrangement, a task analysis was offered for each subcategory. Decision rules which tested the inclusion of task analysis steps were:

a. Requirements are specified in graded competitions and music performance events, such as Piano Guild auditions, Ohio Music Teachers' Association (OMTA) events, Ohio Music Education Association (OMEA) competitions, and college entrance auditions

b. The sequence follows typical instructional progression as suggested in well-known, commercial curriculum sources

c. The sequence is appropriate for use with students who have motor difficulties

d. The steps begin at a rudimentary level and are
finely sequenced to insure success for students
who have serious handicaps

5. The subcategory steps were cued to a standard
curriculum source which enabled the teacher to find
examples from which the skill could be studied,
practiced, or assessed. The sequence of subcategory
steps may differ from student to student depending
on the type and the severity of the handicap; thus,
a standard curriculum source may not present new
information in an appropriate order for all
students. Cuing subcategory steps to a standard
source enables presentation of new concepts and
skills according to student need, yet provides an
accessible resource for both instruction and
practice

6. Skill statements, adapted from Stephens' components
of criterion measures,\textsuperscript{13} were written for the piano
skills assessment battery to measure the level of
student achievement before instruction began and
again after instruction had been completed

7. The last step of this process was not a part of the
present study. However, this step would include a
field test with subsequent revisions to determine if
the tasks are sequential, if the directions are
clear, and if the criterion levels are reasonable.
The original plan for the current study was to write a formal assessment battery to measure piano skills development which would encompass each of the six instructional areas. Appendix C presents one example of the culmination of this entire process in the instructional area of Technique.

The original decision to write a formal assessment was revised before the study began. Instead, subcategories of instructional areas were task analyzed for students as needed. Informal assessment of each step was achieved through observation of student performance within the criterion limits of targeted objectives.

The accuracy of this revision in contrast to that of a formal assessment instrument can only be determined by further research; however, the informal assessment procedure appeared to be adequate for purposes of the present study. It also provided a realistic model for other independent piano teachers to use. Unlike educators who work in school or institutional settings, the private teacher has no source of financial subsidy for purchase of curriculum and equipment for students. The purchase cost of a formal assessment instrument would be prohibitive for most independent teachers as an out-of-pocket expense. Parents of the handicapped student could be asked to purchase such an assessment, but for many, the purchase of a piano, the cost of music and lesson tuition is already a
large financial commitment, and many families are already overloaded with large medical and educational expenses in addition to music lessons.

Learning to administer a formal instrument of this kind would also present a problem for many independent teachers. Administration and evaluation of formal assessment instruments is not within the content of many piano pedagogy courses, and most independent teachers do not teach enough handicapped students to warrant the expenditure of private training time and training costs. Therefore, additional research is needed to determine the need for and practicality of a formal assessment instrument for the development of functional piano skills.

In summary, there appears to be a developmental order to the presentation of keyboard skills, but further research is needed to:

1. Provide piano teachers with a sequential analysis of instructional areas which has been tested for developmental order

2. Determine an appropriate task analysis for each subcategory

3. Design an efficient and accurate assessment system for the independent teacher which is within the cost limitations imposed by the lack of supplemental support for purchase of assessments and supplies.
4. Is It Possible to Develop Measurable Objectives From A Developmental Sequence of Piano Instructional Steps?

In the current investigation, developmental steps from the MPSDHP were written into behaviorally stated objectives and were measured systematically. This process has been discussed in Chapter III of the present study.

The use of the proposed, adapted systematic instructional system was not intended to be an experimental pilot study with verifiable results as to its effectiveness. No provisions were made for interobserver agreement in measurement of objectives, and no applied behavior analysis research design was employed to provide for elements of prediction, replication, and verification. Therefore, no conclusions can be made concerning the system's effectiveness as a result of this study. Further research would be required to test system efficiency.

5. Is Such a System Practical for Use in a Typical Independent Piano Studio Setting?

The purpose of initiating the program into a private studio setting was to determine if the adapted system could be used in a typical studio consisting primarily of nonhandicapped learners. In the present study, the ratio of nonhandicapped learners to handicapped learners was approximately 4:1, which is probably a higher ratio of handicapped learners than would be found in most piano
studios. However, handicapped students were assigned randomly to lesson times during the week so that their lessons would be interspersed throughout the teaching schedule rather than being taught one after another. A description of the implementation process within an independent studio is described in Chapter III of the present study.

In the current investigation, the plan worked very smoothly. More outside-of-lesson-time was spent planning for handicapped students than for nonhandicapped students, but as the instructor became familiar with the system, less outside-of-lesson planning time was needed. Some modifications in the original design of the study were necessary. For example, the method for data collection was modified. At first, weekly data were collected on the same I. M. E. P. page upon which the short term objectives were written. At the end of the teaching day, this information was transferred to a graph and placed in the folder. This system was accurate but very time consuming. Design and use of the graph booklet made graphing of data more efficient. Since each studio differs in design and format, changes would need to be made on an individual basis to make the system practical for other teachers.

Although the increases of skills which were noted during the study cannot be attributed directly to the system which was used, it was encouraging to note that
during the study, each handicapped student made measurable progress in every assessed area.

The system used in the present study was adaptable to different studio activities which were offered throughout the year. For example, the format of lessons during summer quarter differed from that of the previous three quarters. Both handicapped and nonhandicapped students within the studio, in consultation with their parents, were given a choice of three options which would comprise six of the eleven weeks of summer quarter. Students could choose from the following activities:

1. A continuation of the previous year's program with weekly private lessons
2. Private lessons for five weeks and an enrichment block of six lessons which included various group activities. Students could select group lesson topics from a list which included lessons in pairs with an emphasis in sightreading and review, ensemble work, field trips, and a music history drama workshop
3. An intensive program of study whereby the student could arrange both private and group lessons within an individualized time frame with up to three lessons during the week. Content of this intensive program of study included regular private lessons with supplementary group work in harmonization and
transposition skills, improvisation, and a computerized theory program.

The summer options plan was designed to provide motivation for increasing reading and performance skills during summer months and to accommodate students who would be absent for a large block of time during the summer for vacations and summer camps. In addition, the plan offered a change of pace to the usual format of piano lessons.

The close of summer activities included an All-Nite-Marathon Celebration during which students, who had registered for this activity, performed a prepared program of music throughout the night, each student being monitored by a teacher as to total playing time. The student's total playing time was calculated by a formula which took into consideration accuracy, length of study, and effectiveness of performance. Each performing student earned a prize, based on his total earned score. Pizza making, games, and other activities were available throughout the night. This end-of-quarter activity, held in a local church, was available to any student who wished to register.

This opportunity of unique summer enrichment options, an annual feature of the instructor's teaching format, was designed to include handicapped students so that two separate summer programs would not be necessary, and handicapped and nonhandicapped students could be integrated
within studio activities. At lessons, instruction of targeted objectives and systematic data collection continued on a regular basis, whether the lessons selected were private or group lessons.

No objectives were set for measurement of the success of this summer program; however, planning and implementation of the project worked smoothly. Many parents of handicapped students chose the first option of continuing private lessons throughout the summer rather than group participation, but some handicapped students did participate with nonhandicapped students in group activities; for example, five handicapped students registered for and attended the All-Nite-Marathon Celebration.

In summary, use of the adapted systematic instruction plan within an independent piano studio setting included many benefits:

1. It was possible to keep complete records of the exact step of learning each student had mastered
2. Parents could be informed as to the student's progress in precise terms
3. Lesson time was used effectively since the instructor knew exactly what needed to be accomplished each week
4. Use of the graph booklets provided ongoing reinforcement for both teacher and student, and,
teacher enthusiasm remained at a high level because it was possible to see student progress as it developed from week to week.

Adaptation of the systematic instruction system appeared to be a very practical way to teach piano students with handicaps within a private studio setting.

6. **How Can Individual Student Progress be Monitored From Week to Week in Such a Setting?**

The graph booklet provided the weekly monitoring needed, and made it possible to record data on a graph as the skill was being assessed. Although this technique required some practice at first, it appeared to be a highly-efficient way to collect and record data. This technique is discussed in Chapter III of the present study.

7. **Is it Realistic to Propose That Such a System be Used by Piano Teachers Who do not Have Specialized Training in Special Education?**

More research is needed before this question can be answered. Most studio teachers are familiar with and have learned to cope with typical teaching problems, such as:

1. Students who do not practice regularly
2. Students who temporarily lose interest in piano study
3. A wide range, although usually within normal limits, of physical and mental abilities and work habits.

4. The student who, for some unknown reason, has undue difficulties in one or more components of piano study.

While many of the problems encountered in teaching handicapped students are different from those of nonhandicapped students, experienced piano teachers have developed skills in problem solving, helpful in any kind of difficult teaching situation.

Some private piano teachers may feel hesitant at the prospect of teaching a student who is handicapped until they have had some kind of specialized training. However, recent conferences, workshops, and conventions have offered seminars designed to help teachers teach handicapped students, and many journal articles discuss methods which have been useful in teaching students with handicaps. Specialized training in Special Education would, of course, make the process easier and would, no doubt, result in higher student achievement at the beginning. However, many piano teachers with no specialized training and with no specialized system for their use are now teaching handicapped students. It would seem that, for these teachers, a structure which was designed specifically to teach the handicapped student would certainly make the job easier and possibly more effective.
Question 7 cannot be completely answered within the limits of the present study; however, the study does propose a method which has the potential of presenting piano teachers with a workable structure for teaching piano skills to handicapped students.

References


4. Ibid., p. 205.

5. Ibid., p. 206.

6. Ibid., p. 205.


CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of the current study was to propose an adaptation of the systematic instruction model to teach keyboard skills to handicapped students. The need for the study was based on a review of the literature and the conviction that handicapped students can be taught piano performance skills. It was believed that success in piano performance for handicapped persons would be dependent not only upon the musical skill of the teacher, but also upon a systematized and structured plan of study.

Results of an extensive literature review of the use of systematic instruction in piano study were presented in Chapter II of the present investigation. The literature search began with an overview of the historical development of systematic instruction and proceeded by exploring three areas in depth:

1. Development of systematic instruction as it applies to special education

2. Use of systematic instruction in music education and general music classrooms
3. Development of instructional methods which are used to teach piano skills to handicapped students.

The literature review represents a binding together of these three areas, for it is within these merged backgrounds that a proposal for the use of systematic instruction to teach piano to handicapped learners can be developed.

Many authors supported the concept of teaching piano performance skills to handicapped persons, reported successes in that endeavor, and listed both musical and nonmusical benefits as a result of piano instruction. The literature search revealed that many elements from systematic instruction have been used successfully to teach concepts and performance skills in general music classes. However, in the many articles which discussed teaching piano to students with various kinds of handicaps, very few documents were found which recommended the use of behavioral techniques. Only one reference to the use of a systems approach to piano instruction was found, and although instruction was presented in systematic fashion in this reference, no method of data collection or evaluation was recommended. Very few articles described use of behavioral principles to teach piano to handicapped learners in independent piano studios. Most sources reported case studies of handicapped students who had benefited from piano instruction, described various
instructional techniques used by their teachers, or presented curriculum resources and equipment designed specifically for persons with handicaps. A few articles recommended the use of isolated behavioral components for piano instruction, but no references were found that demonstrated the adaptation of systematic instruction with its behavioral components to teach keyboard skills to either handicapped or nonhandicapped persons.

Critical components of the systematic instruction model were identified in Chapter III. Four components of the model were adapted to teach piano skills to handicapped students. The adapted system was then used to teach 15 handicapped students who were enrolled for piano lessons in the studio of an independent piano teacher. Based on Stephens' Directive Teaching Instructional Management System (DTIMS), the components of assessment, planning, instruction, and evaluation were organized in a folder format for each handicapped student within the studio to enable the teacher to have ready access to preplanned objectives and past progress reports.

Six instructional areas of keyboard performance were designated for the present investigation, including Improvisation/Harmonization, Technique, Reading/Adapted Reading, Rhythm, Theory, and Performance/Repertoire. Subcategories of instructional areas were delineated in a lattice format to include prerequisite skills and
fundamental stages of beginning piano instruction. A graph booklet provided an efficient and continuous record keeping system which targeted instructional short term objectives and reflected weekly progress. A MPSDHP chart, stapled to the back cover of the student’s folder, listed the latticed instructional areas and provided a report of annual progress. Instructional programming for the following year was based on the progress results shown on the MPSDHP.

The process of instruction, termed "Intentional Teaching", was designed to embody concepts of systematic instruction within a process which could be integrated into the teaching schedule of an independent studio teacher.

Seven questions, addressed by the current study, were discussed in Chapter IV. Strengths and weaknesses of the investigation were identified, and changes which were included during the implementation period were described.

Conclusions

Based on documented reports, systematic instruction is an appropriate system for teaching both academic and self-help skills to handicapped students. According to a recent report by Fuchs and Fuchs,² specific factors within a systematic formative evaluation approach to systematic instruction contributed to effective learning for handicapped students. Systematic and frequent monitoring of educational programs was necessary, with program
modification based on the analysis of the data within the guidelines of specific rules. Other factors included the use of behavior modification and the use of graphed data displays. All of these elements were present in the current investigation.

It would appear that the proposal presented in the present study is an appropriate approach for teaching keyboard skills to handicapped students. Piano instruction is compatible with the systematic instruction model, because basic piano skills can be presented in a developmental sequence, can be defined in behavioral terms, and can be measured by observation of performance.

No conclusions can be made concerning the effectiveness of the adapted system to the area of piano instruction based on the current study. However, successful implementation of the process was completed, and all handicapped piano students made measurable gains in each assessed instructional area.

The current study was conducted by a piano teacher who had received specialized training in Special Education and who had prior experience in teaching students with handicaps. Therefore, the value of the adapted system to piano teachers who are teaching handicapped students, but who do not have specialized training or experience in Special Education, is speculative without further research.
Recommendations

Continued research is needed to improve the proposed system design and to test it in the private studios of other piano teachers. Possibilities for further research include:

1. A research study which will define the instructional areas needed for piano study and which will present a documented lattice of critical basic skills (subcategories) within each instructional area. A secondary study could examine the question concerning whether the order of concept and skill presentation makes a difference in learning, and if it does, determine which order is most effective. It would be important to know what order of presentation is used currently by other experienced teachers, such as state-certified instructors belonging to the Music Teachers National Association (MTNA), so that a lattice could be designed which is accurate, but which is also adaptable to many different studios and teaching styles.

2. A study which will task analyze each subcategory of the instructional areas, placing each step in sequential order.

3. Development of an efficient assessment system which will measure student progress accurately, be...
inexpensive and easy to administer, and require a minimum of outside-of-lesson evaluation time

4. Replication of the present study under experimental conditions to determine instructional effectiveness of the proposed system. Several changes in the MPSDHP would be recommended before testing. The design could be more useful by subdividing the two areas of Harmonization/Improvisation and Repertoire/Performance, now grouped together, and by adding an instructional area of Eartraining. The six existing instructional areas would then be changed to nine areas and would include: Improvisation, Harmonization, Technical Skills, Reading Skills (still subdivided into Adapted Notation and Traditional Notation), Theory, Eartraining, Rhythm, Repertoire, and Performance. Within the current instructional area of Improvisation/Harmonization Skills, the order of "Question/Answer Improvisation" and "Create Short Phrase Story Songs" should be reversed. In the current investigation, it was determined that most handicapped students were able to create story songs before they could participate successfully in question/answer improvisation

5. Subsequent field tests to determine the adaptability and usefulness of the proposed system to other piano
teachers who teach handicapped students

6. A study which will test the necessity for specialized training or experience in Special Education to determine if these two factors are essential to the success of the proposed design.

7. A study which will develop practice guidelines to help parents or caregivers work effectively with students at home, so that daily practice can be consistent with instructional goals. The format of weekly lessons rather than daily instruction weakened the present study, but daily lessons were not feasible because of cost and transportation problems. Parental supervision of daily practice at home appears to be the most optimal solution, but consistency in instruction between home and studio is critical. Parents are often willing to supervise practice sessions, but they need guidelines which will provide consistent instruction and positive feedback to both student and parent.

8. A study which will design and test an effective method for reporting student progress to parents or caregivers which is objective, easy to understand, and yet requires minimum amount of outside-of-lesson-time to prepare.

9. A study which will explore generalization of the proposed systematic instruction design to teach
nonhandicapped piano students. Many students experience periods of achievement interspersed with "slumps" throughout the course of piano study. Slump periods may be due to many causes, such as difficulty in mastery of new skills and concepts, all-consuming interest in peer relationships, or rebellion against practice expectations. Prolonged slump periods can result in diminished rate of student progress and increased family conflict. Eventually the student may feel that he cannot succeed and may express the wish to discontinue piano lessons. A research study could be designed to test the usefulness of the proposed system for teaching nonhandicapped students who are experiencing slow progress.

Music is a valuable experience for all persons. Even the severely handicapped student can benefit from keyboard instruction. However, there appears to be little research available to provide information about the procedures which can best teach keyboard skills to handicapped students regardless of the degree of severity of their handicapping condition. Parents who decide to provide their handicapped child the opportunity of private music study have the right to expect that their child will be taught by methods which have been researched and proven to be effective for this population. Piano teachers who elect to expand their
teaching to include students with handicaps should have for their use an educational system which can individualize instruction and measure small steps of progress objectively. At the same time, such a system must be adaptable to a private studio setting where many students are taught one after another, either individually or in small groups, by a teacher whose expertise is in the area of piano performance, piano pedagogy, or music education rather than in special education. Handicapped students enrolled in private piano lessons have the right to learn piano performance skills according to their level of ability and interest. Such an achievement can provide an enjoyable leisure skill for life, become a vehicle for self-expression, and serve as a possible source for increased self-esteem.

References


APPENDIX A

FORMAT FOR INDIVIDUALIZED MUSIC EDUCATIONAL PLAN
APPENDIX B

INTERVIEW GUIDELINES
NAME ___________     PARENTS ____________
ADDRESS ________   ZIP CODE ______
PHONE ________   AGE ______   BIRTHDAY _______   SCHOOL ______
GRADE LEVEL (Reading) _______ (Math) _______ MUSIC EXPERIENCE ______
NUMBER RECOGNITION _______ COLORS _______ LETTERS ______
MED. DIAGNOSIS _______ MEDICATION ______
ALLERGIES _______   MEDICATION ______
BEHAVIOR PROBLEMS _______      MEDICATION ______
LEARNING PROBLEMS _______ SUGGESTIONS FOR REINFECERS _______
DO NOT: _______   MEDICATION _______
PARENTAL EXPECTATIONS/GOALS _______
                               MEDICATION _______
                               MEDICATION _______
                               MEDICATION _______
PRACTICE EXPECTATIONS ______
PERFORMANCE OPPORTUNITIES _______

CHECKLIST
1. Ask about availability of a tape recorder
2. Explain newsletter and group experiences
3. Discuss communications, conferences
4. Ask for medical reports and I.E.P
5. Discuss expectations of progress
6. Explain progress chart
7. Discuss absences
8. Review policy statement
9. Answer questions.
APPENDIX C

CLASSIFICATION STEPS WITHIN THE INSTRUCTIONAL
AREA OF TECHNIQUE INCLUDING EXAMPLES OF
CRITERION MEASURES (SKILL STATEMENTS)
Numbering cues
(page/grade level)

1.0 TECHNIQUE

1.1 Five finger position/pentascale

1.11 Cluster tones . . pp. 6-7, level 1A

1.111 Black keys

1.1111 Groups of two . . p. 6, level 1A
1.1112 Groups of three . p. 7, level 1A

1.112 White keys

1.1121 Groups of two . . p. 20, level 1A
1.1122 Groups of three . pp. 21-22, level 1A

1.1123 Groups of four

1.1124 Five-finger position groups of keys

1.11241 Group 1 keys (C G F) . . p. 23, level 1A
1.11242 Group 2 keys (D A E)
1.11243 Group 3 keys (Db Ab Eb)
1.11244 Group 4 keys (Bb B Gb)

1.12 Diatonic progression/disconnected: Any fingering pattern

1.121 Ascending/descending in parallel motion

1.1211 Major keys . . p. 33, level 1A
1.12111 Hands alone
1.12112 Hands together

1.1212 Minor keys . . p. 59, level 1A
1.12121 Hands alone
1.12122 Hands together

1.122 Ascending/descending in contrary motion

1.1221 Major keys . . p. 42 level 1B
1.12211 Hands alone
1.12212 Hands together

1.1222 Minor keys
1.12221 Hands alone
1.12222 Hands together

1.13 Diatonic progression/staccato . . p. 56e, level 1A

1.131 Ascending/descending in parallel motion

1.1311 Major keys
1.13111 Hands alone
1.13112 Hands together

1.1312 Minor keys
1.13121 Hands alone
1.13122 Hands together

1.132 Ascending/descending in contrary motion

1.1321 Major keys
1.13211 Hands alone
1.13212 Hands together

1.1322 Minor keys
1.13221 Hands alone
1.13222 Hands together

1.14 Diatonic progression/legato . . p. 35, level
1A
1.141 Ascending/descending in parallel motion
1.1411 Major keys
  1.14111 Hands alone
  1.14112 Hands together
1.1412 Minor keys
  1.14121 Hands alone
  1.14122 Hands together
1.142 Ascending/descending in contrary motion
1.1421 Major keys
  1.14211 Hands alone
  1.14212 Hands together
1.1422 Minor keys
  1.14221 Hands alone
  1.14222 Hands together
1.15 Diatonic progression with independence of hands:
   Legato against staccato . . p. 11. level
1B
1.151 Ascending/descending in parallel motion
1.1511 Major keys
  1.15111 Hands alone
  1.15112 Hands together
1.1512 Minor keys
  1.15121 Hands alone
  1.15122 Hands together
1.152 Ascending/descending in contrary motion
1.1521 Major keys
  1.15211 Hands alone
  1.15212 Hands together
1.1522 Minor keys
  1.15221 Hands alone
  1.15222 Hands together
1.16 Diatonic progression with independence of hands:
   Loud against soft . . p. 42, level 1A
1.161 Ascending/descending in parallel motion
1.1611 Major keys
  1.16111 Hands alone
  1.16112 Hands together
1.1612 Minor keys
  1.16121 Hands alone
  1.16122 Hands together
1.162 Ascending/descending in contrary motion
1.1621 Major keys
  1.16211 Hands alone
  1.16212 Hands together
1.1622 Minor keys
  1.16221 Hands alone
  1.16222 Hands together
1.2 Arpeggios
1.21 Broken three-note triad . . p. 42, level 1A
1.211 Ascending/descending in parallel motion
1.2111 Major keys
  1.21111 Hands alone
  1.21112 Hands together
1.2112 Minor keys
  1.21121 Hands alone
  1.21122 Hands together
1.212 Ascending/descending in contrary motion
1.2121 Major keys
  1.21211 Hands alone
  1.21212 Hands together
1.2122 Minor keys
  1.21221 Hands alone
  1.21222 Hands together
1.22 Broken chords in extended octaves . . p. 28, level 1B
1.221 Ascending/descending: Crossing hands
  1.2211 Length of octave (1 to 4)
  1.2212 Major keys/minor keys
  1.2213 Speed (16th note = 40 to quarter note = 60)
1.222 Ascending/descending: parallel motion. . p. 28, level 5
  1.2221 Hands alone/together
  1.2222 Length of octave (1 to 4)
  1.2223 Major keys/minor keys
  1.2224 Speed (16th note = 40 to quarter note = 60)
  1.2225 Varying interval relationships
    1.22251 Octaves
    1.22252 Thirds
    1.22253 Sixths
    1.22254 Tenths
1.223 Ascending/descending: contrary motion
  1.2231 Hands alone/together
  1.2232 Length of octave (1 to 4)
  1.2233 Major keys/minor keys
  1.2234 Speed (16th note = 40 to quarter note = 60)
  1.2235 Varying interval relationships
    1.22351 Octaves
    1.22352 Thirds
    1.22353 Sixths
    1.22354 Tenths
1.224 Ascending/descending: With inversions
  1.2241 Hands alone/together
  1.2242 Major keys/minor keys
  1.2243 Speed (16th note = 40 to quarter note = 60)
1.3 Chords/inversions
  1.31 Root position . . p. 31, level 2
  1.311 Triads
1.311 Major
  1.3111 Hands alone/together
  1.3112 Hand shape
  1.3113 Fingering
  1.3114 Ascending/descending
  1.3115 All Keys

1.3112 Minor
  1.31121 Hands alone/together
  1.31122 Hand shape
  1.31123 Fingering
  1.31124 Ascending/descending
  1.31125 All keys

1.3113 Diminished
  1.31131 Hands alone/together
  1.31132 Hand shape
  1.31133 Fingering
  1.31134 Ascending/descending
  1.31135 All keys

1.3114 Augmented
  1.31141 Hands alone/together
  1.31142 Hand shape
  1.31143 Fingering
  1.31144 Ascending/descending
  1.31145 All keys

1.32 Inversion positions

1.321 Triads . . p. 31, level 1B

1.3211 Major
  1.32111 First inversion
  1.32112 Second inversion
  1.32113 Complete sequence
    1.321131 Hands alone/together
    1.321132 Hand shape
    1.321133 Fingering
    1.321134 Ascending/descending
    1.321135 All keys

1.3212 Minor
  1.32121 First inversion
  1.32122 Second inversion
  1.32123 Complete sequence
    1.321231 Hands alone/together
    1.321232 Hand shape
    1.321233 Fingering
    1.321234 Ascending/descending
    1.321235 All keys

1.3213 Diminished
  1.32131 First inversion
  1.32132 Second inversion
  1.32133 Complete sequence
    1.321331 Hands alone/together
    1.321332 Hand shape
    1.321333 Fingering
    1.321334 Ascending/descending
1.321335  All keys
1.3214  Augmented
  1.32141  First inversion
  1.32142  Second inversion
  1.32143  Complete sequence
    1.321431  Hands alone/together
    1.321432  Hand shape
    1.321433  Fingering
    1.321434  Ascending/descending
    1.321435  All keys

1.4  Cadences/Inversions
  1.41  Root position . . p. 35, level 2
    1.411  I V7 I (modified, using 2-note intervals)
      1.4111  Major keys
        1.41111  Hands alone/together
        1.41112  Hand shape
        1.41113  Fingering
        1.41114  All keys
      1.4112  Minor keys
        1.41121  Hands alone/together
        1.41122  Hand shape
        1.41123  Fingering
        1.41124  All keys
    1.412  I V7 I (using triads)
      1.4121  Major keys
        1.41211  Hands alone/together
        1.41212  Hand shape
        1.41213  Fingering
        1.41214  All keys
      1.4122  Minor keys
        1.41221  Hands alone/together
        1.41222  Hand shape
        1.41223  Fingering
        1.41224  All keys
    1.413  I IV I (modified, using 2-note intervals)
      1.4131  Major keys
        1.41311  Hands alone/together
        1.41312  Hand shape
        1.41313  Fingering
        1.41314  All keys
      1.4132  Minor keys
        1.41321  Hands alone/together
        1.41322  Hand shape
        1.41323  Fingering
        1.41324  All keys
    1.414  I IV I (using triads)
      1.4141  Major keys
        1.41411  Hands alone/together
        1.41412  Hand shape
        1.41413  Fingering
1.414 All keys
1.4142 Minor keys
  1.41421 Hands alone/together
  1.41422 Hand shape
  1.41423 Fingering
  1.41424 All keys
1.415 I IV I V₇ I (modified, 2-note intervals)
  1.4151 Major keys
    1.41511 Hands alone/together
    1.41512 Hand shape
    1.41513 Fingering
    1.41514 All keys
  1.4152 Minor keys
    1.41521 Hands alone/together
    1.41522 Hand shape
    1.41523 Fingering
    1.41524 All keys
1.416 I IV I V₇ I (using triads)
  1.4161 Major keys
    1.41611 Hands alone/together
    1.41612 Hand shape
    1.41613 Fingering
    1.41614 All keys
  1.4162 Minor keys
    1.41621 Hands alone/together
    1.41622 Hand shape
    1.41623 Fingering
    1.41624 All keys
1.42 Inversion positions
  1.421 I V I
    1.4211 Major keys
      1.42111 First inversion
      1.42112 Second inversion
      1.42113 Complete sequence
        1.421131 Hands alone/together
        1.421132 Hand shape
        1.421133 Fingering
        1.421134 All keys
    1.4212 Minor keys
      1.42121 First inversion
      1.42122 Second inversion
      1.42123 Complete sequence
        1.421231 Hands alone/together
        1.421232 Hand shape
        1.421233 Fingering
        1.421234 All keys
  1.422 I IV I V I
    1.4221 Major keys
      1.42211 First inversion
      1.42212 Second inversion
      1.42213 Complete sequence
        1.422131 Hands alone/together
1.422132 Hand shape
1.422133 Fingering
1.422134 All keys
1.4222 Minor keys
1.42221 First inversion
1.42222 Second inversion
1.42223 Complete sequence
   1.422231 Hands alone/together
   1.422232 Hand shape
   1.422233 Fingering
   1.422234 All keys

1.5 Scales
1.51 Pentascale review
   1.511 Major/minor key groups
      1.5111 Group 1 keys
      1.5112 Group 2 keys
      1.5113 Group 3 keys
      1.5114 Group 4 keys
   1.512 Parallel motion/contrary motion
      1.5121 Hands alone/together
      1.5122 Finger position
1.52 Scales by tetrachord . . p. 40, level 1B
   1.521 Major/minor keys beginning on a white key:
      Ascending/descending
   1.522 Major/minor keys beginning on a black key:
      Ascending/descending
1.53 Scales in octaves (1 to 4)
   1.531 Ascending/descending in parallel motion
      1.5311 Hands alone/together with correct fingering
   1.5312 Length of octaves (1 to 4)
   1.5313 Major keys
      1.53131 Scales beginning on white keys
      1.53132 Scales beginning on black keys
   1.5314 Minor keys . . p. 24. level 3
      1.53141 Scales beginning on white keys
         1.531411 Natural form
         1.531412 Harmonic form
         1.531413 Melodic form
      1.53142 Scales beginning on black keys
         1.531421 Natural form
         1.531422 Harmonic form
         1.531423 Melodic form
   1.5315 Speed (16th note = 40 to quarter note = 60)
   1.5316 Varying interval relationships
      1.53161 Octaves
      1.53162 Thirds
      1.53163 Sixths
      1.53164 Tenths
1.532 Ascending/descending in contrary motion, p. 16, level 3
  1.5321 Hands alone/together with correct fingering
  1.5322 Length of octave (1 to 4)
  1.5323 Major keys
    1.53231 Scales beginning on white keys
    1.53232 Scales beginning on black keys
  1.5324 Minor keys
    1.53241 Scales beginning on white keys
    1.532411 Natural form
    1.532412 Harmonic form
    1.532413 Melodic form
    1.53242 Scales beginning on black keys
    1.532421 Natural form
    1.532422 Harmonic form
    1.532423 Melodic form
  1.5325 Speed (16th note = 40 to quarter note = 60)
  1.5326 Varying interval relationships
    1.53261 Octaves
    1.53262 Thirds
    1.53263 Sixths
    1.53264 Tenths

1.54 Chromatic scale, p. 18, level 3
  1.541 Ascending/descending in parallel motion
    1.5411 Hands alone/together with correct fingering
    1.5412 Length of octave (1 to 4)
    1.5413 Speed (16th note = 40 to quarter note = 60)

Examples of criterion measures (skill statements)

Criterion measures contain four parts: the specific task, the terminal criteria, the directions to the student, and the items for measuring student performance.4

TASK: Verbally identify groups of two black keys and groups of three black keys as they are played on the keyboard.

TERMINAL CRITERION: Students will verbalize the number of black keys which have been played, 6/6.

DIRECTIONS: Depress a black key group (groups of 2 or 3) on the piano. When each tone cluster sounds, say, "Do you see a group of 2 or 3 black keys?" Continue the
process for a total of 6 opportunities in this order:

\[ 2 \ 3 \ 2 \ 2 \ 3 \ 3 \]

(Circle any response which the student misses).

**TASK:** PLAY BLACK KEY CLUSTERS ON THE PIANO KEYBOARD IN 2 BLACK KEY (C# D#) AND 3 BLACK KEY (F# G# A#) GROUPS.

**TERMINAL CRITERION:** Student will press the black key groups on the piano, 6/6.

**DIRECTIONS:** Say "I will say: Play 2 black keys, or play 3 black keys. Using any fingers of either hand, play the black key group that I request anywhere on the keyboard." If the student plays black keys in the correct amount of 2 or 3, but uses incorrect key groupings, the answer is incorrect. Circle any incorrect responses below, writing in the incorrect response above the number.

\[ 3 \ 3 \ 2 \ 3 \ 2 \ 2 \]

**TASK:** Verbally identify groups of 2, 3, 4, and 5 white key clusters on the keyboard in white key pentascale positions (use five finger positions of C Major, G Major, a minor, and d minor.)

**TERMINAL CRITERION:** Student will verbalize the number of white keys, 8/8.

**DIRECTIONS:** Depress white key clusters in groups of 2, 3, 4, and 5 notes on the piano, using various white pentachord positions (Keys of C Major, G Major, a minor, and d minor). As each tone cluster is heard, say "Do you see a 2, 3, 4, or 5 white key group?" Use the order listed below, circling any group that is missed.

\[ 3 \ 5 \ 2 \ 3 \ 4 \ 4 \ 2 \ 5 \]

**References**

1. Willard A. Palmer, Morton Manus, Amanda Vick Lethco,


2. Ibid.

APPENDIX D

SAMPLE: USE OF THE SYSTEMATIC INSTRUCTION MODEL TO TEACH A HANDICAPPED STUDENT
The following simulation will show how the adapted systematic instruction model might be used to teach piano skills to a handicapped student:

1.0 Assessment

1.1 Background Information

Description of Student: Mary is a 10-year-old mentally retarded piano student. She has poor motor coordination, limited language, but good memory skills. Information received from parents indicates that in academic skills, Mary functions below first grade level (see Interview Guidelines in Appendix B). An initial assessment revealed that Mary can identify letters A through G, numbers one through five, and can label seven colors. Mary has studied piano for one year, having had no prior experience with piano instruction. She uses an electric keyboard for home practice. Mary's preferred learning mode is visual/kinesthetic. Potential reinforcers are edibles, hugs, and praise.

Mary's long term goal included use of an alternative reading mode. Mary's area of strength appeared to be recognition of alphabet letters; therefore, based on her long term goal, a prereading curriculum was selected for Mary enabling her to learn new songs by use of an adapted notational system. In this system, melodies are "read" by matching printed alphabet letters to corresponding keys.

1.2 Current Level of Function

During the summer quarter, which marked one year of piano lessons, Mary's skills were evaluated to indicate her current functioning level. This assessment provided information for objectives which were to be programmed for the following year. All six instructional areas were assessed concurrently at that time (see Flow Chart, Figure 1 in Chapter III). During assessment, Mary was able to complete the following tasks:

1.21 Improvisation/Harmonization: Mary has mastered Keyboard Geography skills of identification and performance of groups of two and three black keys in various positions
of the keyboard; imitation of one and
two-note patterns on the keyboard; and, can
identify and play one, two, and three white
key clusters upon request

1.22 **Technique:** Mary can distinguish her left
from her right hand; can demonstrate a
correct body and hand position at the piano;
and, can identify alphabet letters, matching
the letter symbol to a corresponding labeled
key. Using both right and left hands, Mary
can complete this matching task for the keys
C through G.

1.23 **Reading:** Mary is aware of aspects of the
environment; she is able to track an object
on the page; she can follow verbal directions
most of the time; and, she responds
accurately to requests to play notes by steps
and notes which are the same (repeated
notes).

1.24 **Theory:** Mary is able to identify high, low,
and middle positions on the keyboard; she can
identify and perform notes that go up, come
down, and stay the same; and, can identify
and perform groups of notes that are fast and
that are slow. She can not yet identify
sounds that are loud from those that are
soft.

1.25 **Rhythm:** Mary can distinguish sound from
silence; she can move in any manner to a
beat, she can match simple rhythms using one
through three quarter notes; and, she can
keep a steady beat to a song.

1.26 **Repertoire/Performance:** Mary can play six
songs independently, using correct fingering
in either hand. Independently is defined as
playing the song (with two or less note
errors) without any assistance from the
teacher, after finding the correct hand
position.

1.3 **Progress Chart Showing Current Level of Function**

The following MPSDHP (Figure 5) illustrates how
these mastered skills would appear on the progress chart
after one year of piano lessons (also, refer to the
MPSDHP chart, Figure 2, in Chapter III):
<table>
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<tr>
<th>Improv/ Harm</th>
<th>Tech</th>
<th>Notation</th>
<th>Theory</th>
<th>Rhythm</th>
<th>Repet/ Perf</th>
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Figure 5. PROGRESS CHART SHOWING CURRENT LEVEL OF FUNCTION

2.0 Planning

At the end of the summer quarter which completed Mary's first year of lessons, the following short term objectives were programmed for instruction. Instruction began during the subsequent autumn quarter and continued throughout the following teaching year. The objectives for each area were written on a corresponding page of Mary's I. M. E. P. (see Appendix A)

2.1 Improvisation/Harmonization

2.11 Objective #1: Using the piano, Mary will be
able to match one-note and two-note patterns, (steps and skips), first by visual imitation of teacher performance and then by auditory imitation, in three out of three consecutive trials, for mastery of Listening and Imitation Skills

2.12 Objective #2: Mary will be able to create story songs, using various combinations of black keys, white keys, clusters, single notes in steps, single notes in skips, and repeated notes in low, high, and middle positions on the keyboard, with no criterion for accuracy

2.13 Objective #3: Mary will be able to answer a simple five-note question phrase with a corresponding five-note answer phrase (C and G positions) with not more than one prompt, in three out of three consecutive trials. A prompt is defined as a verbal, gestural, or physical cue from the teacher to enable the response to occur

2.2 Technique

2.21 Objective #1: While demonstrating a correct finger position, Mary will be able to play five notes (stepwise up and down) in C position and in G position in three out of three consecutive trials. First Mary will use one hand at a time, then hands together. Correct finger position is defined as fingers two through five touching the key on the fingertip with the first finger joint remaining firm and in a curved position. Correct position of the thumb consists of touching the key with the outer side of the thumb while retaining a slightly inward-curved position

2.22 Objective #2: Mary will be able to use a legato touch to play five notes up and down while retaining correct finger position (hands alone) in three out of three consecutive trials. Legato touch is defined as no lapse in sound and no overlap in sound between any two notes

2.23 Objective #3: Mary will be able to use a staccato touch to play five notes up and down while retaining correct finger position (hands alone) in three out of three consecutive trials. Staccato touch is defined as the key released with a quick upward motion of the hand,
resulting in silence between any two notes of the five-finger pattern

2.3 Reading/Adapted Reading

2.31 Objective #1: Using any combination of fingers, Mary will be able to demonstrate performance of skips independently (ascending and descending) in three out of three consecutive trials

2.32 Objective #2: Using an unlabeled keyboard, Mary will be able to locate white keys (in many positions) which correspond to alphabet letters of A through G. The first sound heard will constitute a response. Mastery consists of assessing each letter/key combination correctly in three out of three consecutive trials

2.33 Objective #3: Using printed alphabet letters from A to G, Mary will be able to read and play twelve five-finger songs in C position of an unlabeled keyboard. Using correct fingering, Mary will play the keys independently as the teacher points to each printed letter

2.34 Objective #4: After the teacher has placed Mary's hands in G position, Mary will be able to transpose all five-finger songs to G position. Transposition will occur by kinesthetic memory of finger patterns, not by reading alphabet letters

2.4 Theory

Mary will be able to distinguish loud sounds from soft sounds, using the studio piano rather than her electric keyboard, by following a series of sequential steps:

2.41 Objective #1, Step #1: Mary will be able to distinguish loud sounds from soft sounds by imitating the teacher's performance of loud as the word, "loud", is said, and soft as the word, "soft", is said in three out of three consecutive trials

2.42 Objective #1, Step #2: Mary will be able to perform loud sounds when the teacher verbally instructs her to "play loud notes, Mary", using a gestural prompt, in three out of three trials

2.43 Objective #3, Step #3: Mary will be able to
perform soft sounds when the teacher verbally instructs her to "play soft notes, Mary", using a gestural prompt, in three out of three trials

2.44 **Objective #4, Step #4:** Mary will be able to perform loud and soft sounds independently upon request in three out of three consecutive trials

2.5 **Rhythm**

2.51 **Objective #1:** Mary will be able to verbalize quarter note, half note, and whole note by visual identification in three out of three consecutive trials

2.52 **Objective #2:** Mary will be able to clap simple four-beat patterns consisting of quarter notes and half notes, imitating the teacher's verbal count and gestural prompts while clapping (turntaking), with no criterion for accuracy

2.53 **Objective #3:** Mary will be able to play on the keyboard simple four-beat patterns consisting of quarter notes and half notes, the teacher counting the pattern aloud (using the note labels of "quarter" and "half note") as Mary plays, with no criterion for accuracy

2.6 **Repertoire/Performance**

2.61 **Objective #1:** Mary will be able to play from memory twelve four-to eight-measure songs with a total of two or less note errors or prompts per song

2.62 **Objective #2:** Mary will perform at least three songs from memory, in the presence of one other family member, with no criterion for accuracy except that the song is recognizable

2.63 **Objective #3:** Mary will perform at least three songs from memory, in the presence of another student, with no criterion for accuracy except that the song is recognizable

3.0 **Instruction**

For purposes of this simulated sample, a specific instructional method will be selected to exemplify the use of various techniques as each short term objective is taught:
3.1 Improvisation/Harmonization: Method of Instruction, Use of Modeling and Shaping Procedures

3.11 Objective #1: Using the piano, Mary will be able to match one-note and two-note patterns (steps and skips), first by visual imitation of teacher performance and then by auditory imitation, in three out of three consecutive trials, for mastery of Listening and Imitation skills.

3.12 Method of Instruction: The teacher says, "Watch me, Mary", as she plays a C on the piano. "C--Now you do it". Mary plays C. "Good job, Mary." Teacher repeats instruction "Watch me, Mary", but does not say "C". Mary plays C. "Good for you, Mary." Teacher plays C-D on the piano. Mary repeats by imitation. When this response is secure, the teacher plays C on a keyboard out of sight, places Mary's finger on C and tells her "Now you play it." Mary plays C. "Good, Mary". Teacher plays C-D out of sight of the student. If Mary responds, she is again praised. If not, the teacher points to the keys C-D as Mary plays. The teacher continues this procedure, gradually using less obvious cues until Mary responds without any prompts.

3.2 Technique: Method of Instruction, Use of Multisensory Approach

3.21 Objective #1, Step #1: While demonstrating a correct finger position, Mary will be able to play five notes (stepwise up and down) in C position and G position in three out of three consecutive trials.

3.22 Method of Instruction: First the teacher explains (auditory) and models (visual) the correct hand position for Mary. Using a "piggyback" position, the teacher places Mary's hand over her hand so that she can feel (kinesthetic) the correct position as they both push the keys.

3.3 Reading/Adapted Reading: Method of Instruction, Use of Prompts

3.31 Objective #1: Using any combination of fingers, Mary will be able to demonstrate performance of skips independently (ascending
3.32 **Method of Instruction**: This method illustrates the gradual diminishing use of prompts which begins with a physical prompt, the most intrusive, proceeds to gestural, and finally ends with a verbal prompt only. For example, the teacher instructs Mary to "Play skips up, Mary." Teacher lifts Mary's hand as she physically manipulates Mary through a series of skips up on the keyboard. "Good job, Mary." When this skill is secure, the teacher again instructs Mary to "Play skips up." Now, she gestures skipping from one key to the next. As the teacher repeats this instruction, her gestures become gradually smaller until she only says, "Play skips up, Mary" and adds a verbal prompt—"Remember to skip a key". In time, the teacher may be able to eliminate any reminder. At that time, Mary will be able to respond independently.

3.4 **Theory: Method of Instruction, Use of Rewards**

3.41 **Objective #1, Step #1**: Mary will be able to distinguish loud sounds from soft sounds by imitating the teacher's performance of loud as the word, "loud", is said, and soft as the word, "soft", is said, in three out of three consecutive trials.

3.42 **Method of Instruction**: Edibles, praise, and hugs have been observed to be reinforcing to Mary. A program of reinforcement is put into effect whereby Mary will be given a raisin paired with praise when she gives a correct response to identifying and performing loud and soft sounds. At first, Mary is given a raisin every time she responds correctly. Gradually this will be changed to a less frequent schedule of reinforcement whereby Mary is given a raisin every third time she responds correctly. In time, Mary is given a raisin only occasionally. The edible is always accompanied by verbal praise. Eventually, only praise will be necessary to maintain the behavior.

3.5 **Rhythm: Method of Instruction, Use of Task Analysis**

3.51 **Objective #3**: Mary will be able to play on the
keyboard simple four-beat patterns, consisting of quarter notes and half notes, the teacher counting the pattern aloud as she plays, with no criterion for accuracy

3.52 Method of Instruction: The skill of performing simple four-beat patterns consisting of quarter notes and half notes can be subdivided into sequential steps (task analyzed) in the following way:

3.521 Mary identifies quarter note and half note symbols

3.522 Mary claps one quarter note by imitation

3.523 Mary claps two quarter notes by imitation

3.524 Mary claps three quarter notes by imitation

3.525 Mary claps four quarter notes by imitation

3.526 Mary claps one to four quarter notes as the teacher says one, two, three, or four in correspondence

3.527 Mary is instructed to clap any number of quarter notes (from one to four) as she counts aloud

3.528 Mary plays a series of one to four quarter notes on the keyboard, counting aloud, as a metronome ticks slow beats (quarter note = 48 - 60)

3.529 Mary claps one half note by imitation, using a downward gesture for the second beat

3.530 Mary claps two half notes by imitation, using a downward gesture for the second beat

3.531 Mary claps one half note, counting "half-note", as a metronome ticks slow beats

3.532 Mary claps two half notes, again counting aloud, as a metronome ticks slow beats

3.533 Mary plays one half note, counting aloud, as a metronome ticks slow beats
3.534 Mary plays two half notes, counting aloud, as a metronome ticks slow beats

3.535 Mary plays a combination of quarter notes and half notes, upon request, as a metronome ticks slow beats

3.536 Pointing to a quarter note symbol, the teacher requests, "Play quarter notes, Mary", and Mary responds, counting aloud, as a metronome ticks slow beats (in series of one to four quarter notes)

3.537 Mary responds to varying quarter note symbols (from one to four) by playing them on the keyboard and counting aloud as a metronome ticks slow beats

3.538 Mary responds to a combination of half note and quarter note symbols by playing them on the keyboard and counting aloud as a metronome ticks slow beats

3.539 Mary responds to varying combinations of half note and quarter note symbols by playing them on the keyboard and counting aloud without a metronome

3.540 Mary responds to varying combinations of half note and quarter note symbols by playing them on the keyboard and whispering the counting

3.6 Repertoire/Performance: Method of Instruction, Use of the Graph as a Motivator/Reinforcer

3.61 Objective #1: Mary will be able to play from memory twelve four-to eight-measure songs with a total of two or less note errors or prompts per song

3.62 Method of Instruction: The student practices a song many times to meet the criterion of two or less note errors per song. Teacher instructions of slow playing, verbalizing notes aloud, correct fingering, and other helpful methods for accurate playing are more likely to be followed as the student sees the results posted on a graph (see Figure 4 in Chapter III)

4.0 Evaluation
Four levels of evaluation occurred during the year. The initial evaluation took place at the beginning of Mary's piano study with a parent interview to obtain background history and an initial assessment to establish Mary's mastery of prerequisite skills. Ongoing and continuous evaluation occurred weekly as data was recorded in her graph booklet. Informal evaluation occurred at the end of each teaching quarter. An annual evaluation occurred at the end of each summer quarter, which included recording Mary's progress for the year on the progress chart (MPSDHP) in her folder.

4.1 Sample: Series of Four Simulated Lessons Using Systematic Instruction

Although all six instructional areas were assessed and evaluated at Mary's lessons throughout the quarter, each area was not always included at each lesson. This section will show how all six areas were taught, assessed, and recorded during a series of four piano lessons at the beginning of autumn quarter.

Objectives, listed above, were targeted for instruction during the teaching year. In the following four lessons, at least one objective from a subcategory of each instructional area was taught and assessed. The gradual progression of instruction can be seen by reading a specific Instructional Area and Step under week #1, then the same Instructional Area and corresponding Step under the three subsequent weeks. Data, collected on graphs in the graph booklet during the four lessons, is also presented for each objective in the following lesson series:

4.11 Week #1, September 13

4.111 Greeting time for Mary

4.112 Improvisation/Harmonization (step 1): Introduce Matching Pitches by turntaking whereby Mary plays a note and the teacher imitates it. No data

4.113 Reading/Adapted Reading (step 1): Instruct playing skips going up by marking the keys with colored dots. No data

4.114 Technique: Locate note upon verbal request by playing the correct keys without using identifying labels. Response was one correct out of seven.

4.115 Repertoire/Performance (step 1): Review
three previously mastered songs, Hot Cross Buns (one note error); Mr. Turkey (no note errors); Mr. Snowman (three note errors)

4.116 Repertoire/Performance (step 2): Introduce new song by rote and pointing cues (Ballerina Dance). No data

4.117 Reading/Adapted Reading (step 2): Introduce reading a song by use of printed alphabet letters (Mary Had a Little Lamb)--introduced entire song. No data

4.12 Week #2, September 20

4.121 Greeting time for Mary

4.122 Improvisation/Harmonization (step 2): Introduce use of black keys songs using one note at a time, right hand only, to Create Story Songs. No data

4.123 Rhythm: Match Rhythms of one, two, three, and four quarter notes. No correct responses, first trial; introduced counting aloud--correct responses on one, two, and three quarter notes. Incorrect response on four quarter notes

4.124 Improvisation/Harmonization (step 1): Match pitches by turntaking, one note at a time--teacher is the leader and Mary imitates. Introduced patterns of C-C and C-D. No correct responses

4.125 Reading/Adapted Reading (step 1): Playing skips going up, no labels but used gestural cues

4.126 Technique: Locate notes without identifying labels. Correct responses on two out of seven

4.127 Repertoire/Performance (step 2): Ballerina Dance, four note errors

4.128 Reading/Adapted Reading (step 2): Mary Had a Little Lamb, use of reading by alphabet letters--entire song was memorized! No data

4.13 Week #3, September 27
4.131 Greeting time for Mary

4.132 Theory: Work on distinguish loud from soft. Unable to verbalize correct response or to perform upon request

4.133 Repertoire/Performance (step 1): Review previously mastered songs. Party Time (two note errors) and Freight Train (one note error)

4.134 Improvisation/Harmonization (step 1): Match Pitches. Was able to match two-note phrases after many trials. No data

4.135 Reading/Adapted Reading (step 1): Performing skips going up. Was able to complete task with gestural prompt, but could skip down only with physical prompt

4.136 Technique: Locate notes without labeled keys. Was able to complete four out of seven notes

4.137 Repertoire/Performance (step 2): Ballerina Dance, two note errors

4.138 Reading/Adapted Reading (step 2): Mary Had A Little Lamb (by memory), one note error

4.14 Week #4, October 4

4.141 Improvisation/Harmonization (step 1): Match pitches. Was able to respond correctly to C-D; introduced C-D-E. No data

4.142 Reading/Adapted Reading (step 1): Performing skips. Was able to respond correctly and independently going up and coming down

4.143 Technique: Locate notes without labeled keys. Was able to complete four out of seven notes—mastery achieved on E and F

4.144 Rhythm: Correct responses on all trials using one to four quarter notes when counting aloud

4.145 Theory: Loud and Soft. No correct responses
4.146 Reading/Adapted reading (step 2): Mary Had a Little Lamb (by memory), one note error

4.147 Repertoire/Performance (step 2): Ballerina Dance, two note errors

4.148 Repertoire/Performance (step 3): Introduce Pumpkin Pie, no data.

The process continued throughout the quarter, at the end of which an informal evaluation occurred. Instruction then continued throughout the remainder of the teaching year.

4.2 Progress Chart Showing Annual Evaluation

At the end of the summer quarter, assessment results were again recorded on Mary's MPSDHP (Figure 6) which showed the following progress:

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<th>Tech</th>
<th>Notation</th>
<th>Theory</th>
<th>Rhythm</th>
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Figure 6. PROGRESS CHART SHOWING ANNUAL EVALUATION
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