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# The Application of Self-Instruction to Elementary School Music

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THE APPLICATION OF SELF-INSTRUCTION  
TO ELEMENTARY SCHOOL MUSIC

A Thesis  
Presented to  
the Faculty of the College of Education  
Western Kentucky University  
Bowling Green, Kentucky

in Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts

by  
Gene S. Austin  
July 1971

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THE APPLICATION OF SELF-INSTRUCTION  
TO ELEMENTARY SCHOOL MUSIC

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## CHAPTER I

### INTRODUCTION

In increasing numbers all over the United States, elementary classrooms are becoming "individualized." Reading, math, science, and social studies materials prepared for individualized learning are appearing at steadily increasing rates. Children are being challenged even at the primary level to make selections from these materials, proceed at their preferred rate, and evaluate their own progress and need for further study. Why, among this vast influx of kits, programs, games, models, and other devices, is there a scarcity of such items designed for use in elementary school music?

Obviously, there is insufficient demand from educators for such materials; otherwise, the educational softwares industry would be making far more marketing attempts in the direction of music education. The absence of such demands may be explained by the attitude of some music educators that music is different from all other kinds of learning and that the structuring of its levels or the defining of its concepts in order to prepare self-teaching materials might somehow invade its aesthetic armor. That cloistered viewpoint can



hide a morass of confused goals and objectives, resulting in the transmission of vague generalizations to "Sesame Street" children--products of a technological society which is fast-moving, direct, colorful, and media-oriented.<sup>1</sup>

Even though there is a trend in elementary education toward individualized and independent learning, elementary music, with few exceptions, continues to be taught solely on a large group basis. This group approach is necessary for some experiences. For example, there must be large-group participation to prepare for a concert or school program. In addition, the classroom teacher often engages his entire group in singing, rhythms, or instrumental activities to give variety to the school day. Performance and recreation are two legitimate musical functions, both needing group participation to be effective. However, if music fulfills only these two purposes, will the individual child have been affected in any positive way culturally or aesthetically so that music will be a constant source of pleasure or inspiration throughout his life?

Perhaps music educators are unwittingly sabotaging their own well-intentioned efforts. Music and classroom teachers prescribe music activities, making selections that suit their own musical tastes. The music student remains

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<sup>1</sup>Harris Darringer, "Music for the Children of Marshall McLuhan," Music Educators Journal, LVII, No. 2 (October, 1970), pp. 21-24.

submissive to his teachers' tastes for years--and then is suddenly expected, when he becomes an adult, to be a knowledgeable and appreciative patron of music. Instead, he may wish to avoid any further contact with music, since up to that point in his life he may have had no opportunities to explore and experiment to develop his own musical tastes and interests. Music educators should begin to offer children a greater latitude of musical choices, allowing them to become individually responsible for a portion of their own music education.<sup>1</sup>

Perhaps the preceding statement implies that all existing methods of teaching music should be abandoned, in favor of some "miracle music" that will turn our nation into a coast-to-coast concert hall. Obviously, no such simplistic implication is intended. Music and the group activities associated with it are a vital part of many schools. No thoughtful music educator would suggest otherwise. It is suggested, however, that other methods exist or could exist and that self-instruction in music offers a new direction in music education. Self-instruction would not supplant group teaching; rather, self-directed learning would supplement the effectiveness of the teacher as he concentrates on group activity.

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<sup>1</sup>Arnold Spoelke and Charles L. Gay, "Is Your Music Program for Real?" Music Educators Journal, IV, No. 7 (March, 1962), pp. 31-33.

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Self-instruction would present some aspects for the music student that group instruction could not offer:

- (1) Self-instruction would afford the child who does not sing comfortably, immediate and numerous alternatives, such as rhythmic and instrumental activities, listening experiences, composition, and research;
- (2) Self-instruction would make music available whenever the student had unscheduled time;
- (3) Self-instruction would expand the effectiveness of the existing music program, which in many schools operates on less than a daily basis;
- (4) Self-instruction could be a workable auxiliary program for the classroom teacher who receives no help from a music specialist;
- (5) Self-instruction would give a child another opportunity to develop skill in decision-making and self-scheduling.

If self-instruction might offer these foregoing advantages, then it seems reasonable to attempt to devise necessary structures and materials for such a program.

#### Significance of the Study

Many in-depth studies have been initiated to evaluate the worth of self-instruction. However, most reports of these studies indicate that the self-directed approach or even individualized instruction, which implies teacher-direction, has been centered on traditional academic subjects--reading, math, science, social studies--and has

either overlooked entirely, or only vaguely alluded to, the arts. This omission may have resulted from the unwillingness of many educators in the arts to specify the sequence of learning for their particular disciplines. Recent studies designed to define conceptual development have now provided concrete bases for the music educators' tasks. Use of these definitions in preparation of materials and activities which are primarily self-directed could add new dimensions to any music program, regardless of its existing scope. Research in the early sixties exposed the fact that seventy to eighty per cent of the elementary classroom teachers surveyed were responsible for all or most of their own music programs.<sup>1</sup> Their enthusiasm for this added responsibility could surely increase if students were able to direct at least a part of their music activities on their own.

This study, which is designed to allow students to independently amplify their musical experiences, presents the possibility of an expanded approach to music teaching, one that can adapt to the "new" curriculum and one which, even though school budget might be restricted, could continue to offer a program which embraces both musical integrity and fiscal economy.

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<sup>1</sup>Lois Webb, compiler, Music and Art in the Public Schools, Research Monograph 1963-64, Hazel Davis, Project Director (Washington, D. C.: National Education Association, 1963), p. 16.

Preparation of this study has been extremely helpful to the writer, bringing an awareness of current philosophies, attitudes, and methods, not only in music but also in the broad field of education. This exposure to existing ideas and practices has resulted not only in new approaches for developing self-direction in children but has also suggested that teachers need to attempt more "self-direction" themselves, putting to use the findings of intensive educational research to produce effective means of helping children to become self-reliant in learning.

#### Purpose of the Study

The purpose of this study is to investigate the effect of self-instruction on achievement in elementary school music at the fourth grade level. In order to study this effect, the investigator will seek answers to the following questions:

1. Which methods of self-instruction are most applicable to children at the fourth grade level?
2. What concepts are basic to the understanding of music?
3. What studies have been concluded to define the range of conceptual developments among fourth graders?
4. What materials and activities are most effective in achieving the desired results based on the above considerations?
5. Is I.C. a significant factor in musical achievement in this particular investigation?
6. Can musical achievement be directly affected by the addition of self-instruction?

### Scope and Limitations of the Study

The study under consideration involved two groups of fourth grade students in Rockford, Illinois, where the investigator is an elementary school music consultant. School A comprised the experimental group (N=27), which followed a combination of self-instruction and group instruction. The control group (N=25) from School B received only group instruction. In order to measure their progress, a standardized music achievement test was administered to both groups before and after the experimental treatment. The test used was designed to be most reliable at the sixth and seventh grade level. Its reliability at the fourth grade level is questionable. Since Groups A and B were not randomly selected, I.C. was introduced as a variable.

The two groups in the study were selected from a number of classrooms available to the investigator because of their similarity in classroom response and the co-operative attitude on the part of the involved classroom teachers.

### Definition of Terms

Commonly used terms in education may have more than one semantic interpretation. Therefore, to clarify the investigator's intent when using certain terms, the following definitions are provided:

Self-Instruction: The term self-instruction is defined as any means by which a student assumes primary responsibility for his own instruction.

Group Instruction: Group instruction is a term applied to instruction given simultaneously to all students in a classroom. Activities are predominantly teacher-directed.

Individualized Instruction: Individualized instruction occurs when "the characteristics of each student play a major part in the selection of objectives, materials, procedures, and time."<sup>1</sup> This form of instruction implies a greater amount of teacher involvement than does independent study.<sup>2</sup>

Contract: A contract is a prepared paper or booklet which is assigned to, or selected by, a student. A contract might be (1) teacher-made and teacher-assigned, (2) teacher-made but student-assigned, or (3) student-made and student-assigned.<sup>3</sup> A contract should contain the name of the concept being developed, the activities necessary to complete the contract, and the criterion by which the student and teacher can measure the level of accomplishment. A contract may contain an agreement between teacher and student regarding length of time and/or procedures necessary to complete the project.

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<sup>1</sup>Thorwald Ebbenson, Working with Individualized Instruction: The Duluth Experience (Palo Alto, California: Fearon Publishing Company, 1958), p. vii.

<sup>2</sup>William M. Alexander, Independent Study in Secondary Schools (New York: Holt, Rinehart, and Winston, Inc., 1957), p. 9.

<sup>3</sup>Ebbenson, op. cit., p. 96.

Concept: A concept is "that which remains in the mind following a given learning experience."<sup>1</sup>

Instructional Objective: An instructional objective states in concrete terms where the student is heading and how he will know when he has arrived.<sup>2</sup>

Independent Study: "Independent study . . . is learning activity largely motivated by the learner's own aims to learn and largely rewarded in terms of its intrinsic value."<sup>3</sup>

Music Achievement Test: The music achievement test referred to in this study is a standardized test prepared by Richard Colwell of the University of Illinois.<sup>4</sup> The acronym MAT is frequently used to identify this test.

#### Summary

Educators are becoming increasingly aware of the advantages of varied methods of instruction. Self-instruction in its several forms has proven highly effective in many subject matter fields and, consequently, has won

<sup>1</sup>Charles L. Gary, ed., The Study of Music in the Elementary School--A Conceptual Approach (Washington: Music Educators National Conference, 1967), p. 2.

<sup>2</sup>Robert F. Mager, Developing Attitudes Toward Learning (Palo Alto, California: Fearon Publishers, 1968), p. 13.

<sup>3</sup>Alexander, op. cit., p. 18.

<sup>4</sup>Richard J. Colwell, Music Achievement Tests 2 and 4 (Chicago: Pollett Educational Corporation, 1970).



widespread approval. However, this method appears infrequently in the music programs now existing in elementary schools. This study explores the possibility of applying self-instructional techniques to music education at the elementary level, specifically the fourth grade. Although there is no intent to remove group instruction from elementary school music, the investigator postulates that students can achieve considerable gains in musical skills through supplementary self-directed music activities.

Children seem to thrive in an educational atmosphere that implies confidence in their ability to accept responsibility and proceed independently. This study is intended to provide them this opportunity in music.

## CHAPTER II

### REVIEW OF THE LITERATURE

This chapter presents a review of previous studies which relate to methods of self-instruction, structure of musical concepts, preparation of objectives, and current methods and measurements in elementary school music.

Individualized Instruction. Self-instruction has been incorporated into a number of existing educational practices. Among these practices is individualized instruction, which appears to be an efficient method of tailoring instruction to the child's ability to learn and the speed with which he can master a concept. Individualized instruction is dependent upon the ability of educators to state their purposes and specific objectives--their skill in defining the "science of schooling conducted through the art of teaching."<sup>1</sup> Parker postulates eight major categories that support the need for individualized instruction--his "Multilevel Philosophy"<sup>2</sup>--and offers a "Checklist for Evaluating the Individual Learning Opportunity of Pupils."<sup>3</sup> Extensive programs in individualized instruction have been

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<sup>1</sup>Don H. Parker, Schooling for Individual Excellence (New York: Thomas Nelson and Sons, 1963), p. 114.

<sup>2</sup>Ibid., pp. 144-153.

<sup>3</sup>Ibid., pp. 264-271

instituted in some school systems. Two notable experiments in the field are those in Duluth, Minnesota,<sup>1</sup> and Baldwin-Whitshell, Pennsylvania.<sup>2</sup> In Duluth, three schools in a pilot project operated under a program of individualized instruction. There were three major emphases: (1) extensive pre-planning and preparation of objectives; (2) locating and purchasing large quantities of materials and equipment; and (3) constant evaluation of the project. Results of the experiment were inconclusive, since achievement scores of experimental and non-experimental students showed no significant difference. However, other factors, such as regular attendance, decreased school vandalism, and attitudes of children toward school, have demonstrated a positive relationship to the experiment.<sup>3</sup>

The University of Pittsburgh has established a program designated as IPI (Individually Prescribed Instruction) in the laboratory school (Oakleaf) in Baldwin-

<sup>1</sup>Esbensen, *op. cit.*

<sup>2</sup>George W. Neill, Individually Prescribed Instruction. Education, U.S.A., Special Report (8th) (Washington, D.C.: National Schools Public Relations Association, 1968); Robert G. Scanlon, "Factors Associated with a Program for Encouraging Self-Initiated Activities by Fifth and Sixth Grade Students in a Selected Elementary School Emphasizing Individualized Instruction" (unpublished Ph.D. dissertation, University of Pittsburgh, 1966); Margaret Li-Ching Chang Wang, "An Investigation of Selected Procedures for Measuring and Predicting Rate of Learning in Classrooms Operating under a Program of Individualized Instruction" (unpublished doctoral dissertation, University of Pittsburgh, 1968).

<sup>3</sup>Esbensen, *op. cit.*, p. 119.

Whitehall, Pennsylvania. Again results have not been completely tabulated, since available tests primarily measure achievement and offer little validity in the measure of self-initiation, creativity, and rate of learning.

Thomas and Crescenbeni<sup>1</sup> have offered helpful "how-to-do-it" suggestions for adapting individualized instruction to existing situations. The book emphasizes classroom organization and preparation of written materials in the fields of reading, math, science, spelling, social studies, and handwriting. Several studies have been undertaken to determine whether individualized instruction can be effectively applied to music education, particularly at the secondary level.<sup>2</sup> The studies cited deal primarily with programmed self-instruction and the use of visual aids. A brief segment of Thomas' book also describes various

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<sup>1</sup>George I. Thomas and Joseph Crescenbeni, Individualized Instruction in the Elementary School (New York: Random House, 1967).

<sup>2</sup>James Bernard Fitzpatrick, "The Development and Evaluation of a Curriculum in Music Listening Skills on the Seventh Grade Level" (unpublished Ph.D. dissertation, University of Iowa, 1968); Stanley F. Michalski, "The Development and Evaluation of a Visual-Aural Program for Self-Instruction in Conceptual Understanding of the Basic Elements of Music" (unpublished Ph.D. dissertation, Clarion State College, 1966); Thomas Vesil and Donald Gillespie, "A Project for the Improvement of Music Education at Elementary, Junior High, Senior High, and College Levels through the Use of Non-Book Instructional Media" (Washington: U.S. Department of Health, Education, and Welfare, Office of Education, Bureau of Research, Project No. OEC-1-6-06213, 1968).

technological applications.<sup>1</sup> An extensive study of new developments in educational technology related to music appeared in a recent issue of the Music Educators Journal.<sup>2</sup> Technology is a unique complement to pedagogy, particularly as it is applied in individualized instruction. However, caution and judgment should be carefully exercised in selecting appropriate technological applications<sup>3</sup> in this "brave new Xeroxed world."<sup>4</sup>

Robert Schaefer has defined most succinctly one of the major problems being faced in the development of individualized instruction:

No one, not even the most dedicated and brilliant, can effectively individualize instruction, systematically analyze his own teaching, diagnose learning difficulties, and maintain a vigorous pedagogical and substantive scholarship on a spare-time basis.<sup>5</sup>

Regardless of the teacher's commitment, human capacities impose limits of endurance and competence. If the individualization is to be effective, the teacher must be allowed a reasonable amount of time away from the classroom to properly prepare for this highly specialized form of instruction.

<sup>1</sup>Thomas and Crescembani, op. cit., pp. 50-57.

<sup>2</sup>"Technology in Music Teaching," Music Educators Journal, LVII, No. 5 (January, 1971), pp. 38-100.

<sup>3</sup>Charles E. Silberman, "Technology Is Knocking at the Schoolhouse Door," Fortune, August, 1966, p. 120 and p. 205.

<sup>4</sup>Robert J. Schaefer, The School as a Center of Inquiry, The John Dewey Society Lecture Series, Number Nine (New York: Harper and Row, 1967), p. 54.

<sup>5</sup>Ibid., p. 61.

Independent Study. Another option for self-instruction is independent study. An overview compiled by William Alexander defines the nature, scope, purposes, and the practical application of independent study in actual school situations.<sup>1</sup> In his conclusions he lists both the problems and advantages of independent study.<sup>2</sup> Independent study is intended to be more nearly like actual adult decision-making than the traditional teacher-directed activities in many schools which are ". . . conceived as educational dispensaries--apothecary shops charged with the distribution of information and skills deemed beneficial to the social, vocational, and intellectual health of the immature."<sup>3</sup> In other words, independent study is one way that the teacher can make himself dispensable because his students will have learned how to learn.<sup>4</sup>

Often such obstacles as ". . . large classes, inadequate space, inappropriate furniture, unimaginative

<sup>1</sup>William M. Alexander, Independent Study in Secondary Schools (New York: Holt, Rinehart, and Winston, Inc., 1967), pp. 1-48.

<sup>2</sup>Ibid., pp. 158-163.

<sup>3</sup>Scheefer, op. cit., p. 33.

<sup>4</sup>Robert L. Brackebury, "Guidelines to Help Schools Formulate and Validate Objectives," National Planning in Curriculum and Instruction: Eight Essays, a publication of the National Education Association Center for the Study of Instruction (Washington: National Education Association, 1967), p. 101.

materials, and lack of supplies . . .<sup>1</sup> inhibit the effectiveness of independent study. However, since children can be remarkably inventive and adaptable even in less than ideal circumstances, there is really only one vital requirement: unassigned time during which the child is free to pursue his particular project without fear of falling behind in his other assignments.<sup>2</sup>

Concept Development. Programs of self-instruction which seem to be most productive are those which are based on careful ordering of sequences in conceptual development accompanied by instructional objectives based on these sequences. Extensive research is being directed toward this area, since leading educators have emphasized that definition of concepts is basic to effective instruction.<sup>3</sup>

Music education has begun to investigate its own basic concepts. An entire publication, appropriately titled Basic Concepts in Music Education,<sup>4</sup> is devoted to definitions, opinions, and identification of concepts in music and music education. An authority in the field of

<sup>1</sup>Lois E. Williams, Independent Learning in the Elementary School Classroom (Washington, D.C.: National Education Association, American Association of Elementary, Kindergarten, and Nursery Educators, 1969), pp. 9-10.

<sup>2</sup>Ibid., p. 13.

<sup>3</sup>Benjamin Bloom, Jerome Bruner, and Jean Piaget have written extensively on this subject, and references to specific works of Bloom and Bruner appear on succeeding pages.

<sup>4</sup>Basic Concepts in Music Education, 57th Yearbook, Part I, National Society for the Study of Education (Chicago: University of Chicago Press, 1958).

early childhood music education proposes two conditions for the formation of a concept:

(1) The child must have a series of experiences that are in (at least) one way similar. These are positive instances of the concept. (2) Before, between, or after the series he must also perceive examples of what the concept is not. For instance, to teach high as a concept in pitch, examples of low must somewhere be included.<sup>1</sup>

Mursell identifies the development of musical concepts as a 'cyclical curricular sequence,'<sup>2</sup> a theory similar to Bruner's "spiral of learning."<sup>3</sup> The Music Educators National Conference, realizing the need for clear statement of concepts, offers a publication which not only lists concepts generally accepted as basic to the musical experience but also includes experiences and resource materials to help in developing these concepts in children.<sup>4</sup> Appended to this book is a Scope and Sequence Chart, from the Los Angeles Public Schools, which defines "constituent elements of music (melody, rhythm, and harmony)" and "expressive elements (tempo, dynamics, and tone color)." The chart suggests levels of learning to sequentially advance to a more complex concept of each element.

<sup>1</sup>Frances Webber Aronoff, Music and Young Children (New York: Holt, Rinehart, and Winston, 1969), p. 30.

<sup>2</sup>James L. Mursell, "Growth Processes in Music Education," Basic Concepts, *op. cit.*, pp. 157-158.

<sup>3</sup>Jerome C. Bruner, The Process of Education (New York: Vintage Books, 1960), pp. 52-54.

<sup>4</sup>Gary, Study of Music, *op. cit.*



Andrews and Diehl compiled an extensive bibliography of studies related to identification of concepts in general, and music in particular, in an attempt to develop a specific technique for identifying elementary school children's musical concepts.<sup>1</sup> In surveying the literature they pointed to a paucity of studies in musical concepts.<sup>2</sup> However, at about the time this study was being concluded, other research was underway or just completed. Dittmore<sup>3</sup> observed sequences of conceptual development as related to certain musical abilities of elementary school students. Rayley<sup>4</sup> devised a plan for developing music curricula based on the sequential development of the student's understanding of basic musical concepts. The Manhattanville Study<sup>5</sup> explored selected music programs in order to discover original procedures and outstanding results. An outgrowth of that

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<sup>1</sup>Frances Andrews and Ned C. Diehl, "Development of a Technique for Identifying Elementary School Children's Musical Concepts" (Washington: U.S. Department of Health, Education, and Welfare, Office of Education, Bureau of Research, 1967), pp. 89-92.

<sup>2</sup>*Ibid.*, pp. 5-12.

<sup>3</sup>Edgar E. Dittmore, "An Investigation of Some Musical Capabilities of Elementary School Students," (unpublished Ph.D. dissertation, University of Iowa, 1968).

<sup>4</sup>Alex Hart Rayley, "Developing Musical Concepts in the Primary Grades" (unpublished Ph. D. dissertation, Columbia University, 1966).

<sup>5</sup>Ronald B. Thomas, "A Study of New Concepts, Procedures, and Achievements in Music Learning, as Developed in Selected Music Programs" (Washington: U.S. Department of Health, Education, and Welfare, Office of Education, Co-Operative Research Project, 1966).

study is the "sample strategy"--a cyclical plan which states the new concept, prerequisite concepts, required skills, problems to be solved, and operational directions. Nye and Nye in their newest edition<sup>1</sup> discuss musical concepts--what they are and how they can be developed, including sample lesson plans based on various theories of instruction. A recent issue of Instructor presented a concise appraisal of an effective music program.<sup>2</sup> The article, designed to help the classroom teacher in the preparation of music activities, emphasized the importance of teaching basic concepts of music.

Instructional Objectives. Once concepts are defined, the whole learning process can become more specific, since instructional objectives are based directly on sequential developments of concepts. Mager<sup>3</sup> has prepared a formula for stating instructional objectives: state the objectives in behavioral terms (what will the student be doing?) and establish a criterion of performance (how can his performance be measured?). Mager bases his philosophy

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<sup>1</sup>Robert Nye and Vernice Nye, Music in the Elementary School (3rd edition; Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1970), chapters ii and iv and pp. 109-149.

<sup>2</sup>Katharine Crews, "Music Every Day," Instructor, (December, 1970), pp. 35-46.

<sup>3</sup>Robert F. Mager, Preparing Instructional Objectives (Palo Alto, California: Fearon Publishers, 1962).

on Bloom's Taxonomy of Educational Objectives,<sup>1</sup> which defines different kinds of objectives in an ascending order of conceptualization. Sanders<sup>2</sup> used Bloom's classification to establish a questioning technique to elicit a particular complexity of thinking. Bloom's Taxonomy is also the basis for an incisive article questioning whether the failure of existing music programs<sup>3</sup> can be directly attributed to the lack of specific objectives in music education.<sup>4</sup>

Perhaps a new direction is needed. Thomas insists that student-directed activities in music which allow the student freedom to start where he is and go as far as he can are yielding high levels of student involvement, accomplishment, and enthusiasm.<sup>5</sup>

Methods. Instruction can be streamlined by the careful application of stated objectives, but efficient imparting of information is not a complete answer for an effective program. There is still the need to select a method that will not only inform students but one that will also appeal to their interests. "Two different

<sup>1</sup>Benjamin S. Bloom, Taxonomy of Educational Objectives (Handbooks I and II; New York: David McKay and Company, Inc., 1956).

<sup>2</sup>Norris M. Sanders, Classroom Questions: What Kinds? (New York: Harper and Row, 1966).

<sup>3</sup>Leon Kavel, "Toward More Defensible Objectives," The Instrumentalist, February, 1968, pp. 45-47.

<sup>4</sup>By the time students reach secondary school only fifteen per cent are directly involved in music.

<sup>5</sup>Thomas, op. cit., p. 19.

teaching techniques may lead to the same goal, but differ in the effects which they produce.<sup>1</sup> Mager observes that learning is associated with either approach or avoidance tendencies:

Our success in influencing future performance is in part a function of our success at sending students away with tendencies to approach, rather than avoid, the things we want them to think about, feel about, and do about.<sup>2</sup>

Methods of instruction which might encourage more "approaching" toward music include discovery,<sup>3</sup> self-selected activities,<sup>4</sup> sound-exploring in an unstructured situation,<sup>5</sup> and, of course, the two broad methods previously discussed: independent study and individualized instruction.

Measurement. Effectiveness of methods must be subjected to some kind of measurement. Achievement level is one way of measuring effectiveness, but since music educators have been traditionally opposed to testing,<sup>6</sup>

<sup>1</sup>James L. Kuethe, The Teaching-Learning Process (Glenview, Illinois: Scott-Foresman and Company, 1966), p. 49.

<sup>2</sup>Mager, Developing Attitudes, op. cit., p. 97.

<sup>3</sup>Charles R. Fowler, "Discovery: One of the Best Ways to Teach a Musical Concept," Music Educators Journal, LVII, No. 2 (October, 1970), pp. 25-30.

<sup>4</sup>Williams, op. cit., p. 16.

<sup>5</sup>William B. Stecher and Hugh McIlhenny, "The Structures of Music Can Fox a Child In," Music Educators Journal, LVI, No. 8 (April, 1970), pp. 54-57.

<sup>6</sup>Richard J. Colwell, "Musical Achievement: Difficulties and Directions in Evaluation," Music Educators Journal, LVII, No. 8 (April, 1971), pp. 41-45ff.

Few acceptable measurements of musical achievement exist.<sup>1</sup> However, Lehman describes Colwell's Music Achievement Test as a "most promising attempt to provide an objective measure" of some basic musical skills and concepts.<sup>2</sup> Hinton<sup>3</sup> selected MAT as the measuring instrument for his state-wide investigation of the relationships between instructional programs and student achievement in Tennessee's elementary school music. The Interpretive Manual,<sup>4</sup> in outlining the rationale behind the test development and establishment of norms, contributes much helpful information to the field of music education.

Summary. Self-instruction is being incorporated in many subject-matter fields through a variety of methods. Individualized instruction is widespread, but this method tends toward teacher-direction and frequently features programmed or quasi-programmed instructional materials as a

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<sup>1</sup>William E. Whybrew, Measurement and Evaluation in Music (Dubuque, Iowa: William C. Brown Company, Publisher, 1962), pp. 135-150; Paul R. Lehman, Tests and Measurements in Music, The Foundations of Music Education Series, Allen P. Britton, ed. (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1968), pp. 57-69.

<sup>2</sup>Lehman, ibid., p. 54.

<sup>3</sup>Thomas E. Hinton, "The Relationship between Selected Aspects of the Instructional Program in Music and Student Achievement of Sixth Grade Students," (Washington: U.S. Department of Health, Education and Welfare, Office of Education, Bureau of Research, 1968).

<sup>4</sup>Richard J. Colwell, Interpretive Manual: Music Achievement Tests 3 and 4 (Chicago: Follett Education Corporation, 1970).

major activity. Independent study, a method through which the student assumes primary responsibility for planning and executing his learning activities, is more closely related to the term "self-instruction" than is individualized instruction.

Although both of these forms of instruction are based on the solid structure of learning sequences, neither individualized instruction nor independent study has become prevalent among elementary school music programs. The infrequent use of these methods may be attributed to vague and inconsistent objectives of elementary school music. The recent attempts of music educators to define musical concepts and their structure have provided a foundation for new techniques in the teaching of music. The formulation of instructional objectives combined with the seemingly unending innovations in educational technology may result in other ways of effectively teaching music than in large groups, over which the teacher presides with authority and discrimination.

Since there has been little agreement on what should be taught in elementary school music, it is not surprising to discover that few measurements have been developed to discover how well music is being taught at the elementary school level.

In reviewing the literature, it seems obvious that music educators who are cognizant of the changes and advances in other fields of elementary education need to

move rapidly toward a more equitable presentation of music in terms of today's media-oriented and individualized society. Self-instruction in elementary school music offers a variation on the traditional theme--a variation which may produce a greater number of children "approaching" music than ever before.

## CHAPTER III

### METHODS AND PROCEDURES

This investigation into the effect of self-instruction on elementary school music achievement involved an experimental group, Group A (N=27), and a control group, Group B (N=25). Group A pursued a combination of self-instruction and group instruction. Group B was given group instruction alone.

The study was conducted during the three-month period beginning the first week of March and extending through the last week of May. This time period was selected because it contained the fewest interruptions such as field trips and school programs and because it was the time most agreeable to all the teachers involved in the study.

Groups A and B were selected from the four fourth-grade classes receiving music instruction from the investigator. Both classes were randomly assigned to homerooms at the beginning of the year. Because of school administrative restrictions, no further randomization could be effected, since any re-assignment would have interfered with existing class schedules and activities in other subject matter areas.



Group A and B were selected because of (1) similarities in class size, (2) willingness of teachers and students to participate in the study, and (3) the equivalence of exposure to classroom music experiences. Students in Group A attended Alpine School, and students in Group B attended Conklin School. According to school records stating parental occupations, both Group A and Group B are comprised mainly of students whose parents are engaged in highly-skilled labor or technical capacities, although Group A showed a slightly higher socio-economic level.

Before the experimental treatment began, both groups (N=52) were pre-tested. The Music Achievement Test, Parts 3 and 4, was selected as the measuring instrument because of the extensive and intensive nature of its preparation and design. This test functions as a measurement of achievement, but it also offers a pleasurable and worthwhile listening experience. Results of the pre-test were compiled for comparison with later post-testing. At this time I.Q. scores were collected from school records, since these scores were to be tested for significant differences which might affect musical achievement.

At the conclusion of the pre-test the experimental period began.

Both groups received group music instruction from the investigator, who followed the general requirements for fourth-grade music instruction as prescribed by the Rockford Public Schools Music Curriculum Guide. Fourth grade students

are expected to participate in singing (unison, descent, and two-part), listening (for mood, repertoire, and form), note-reading, and playing of simple classroom instruments. The prescribed music activities are presented to the entire class at one time by the teacher. The group either participates in the activity simultaneously or watches while some other student demonstrates. No individual activities occur within the classroom situation, although occasionally small groups may form for a specific purpose under the direction of the teacher. The prescribed music curriculum, received by both Group A and Group B, is characterized by large-group instruction and teacher-direction.

Group B received no additional or supplementary music activities. Their function as a control group was to pursue only the standard group music instruction as described in the preceding paragraph.

Group A, while receiving the same group music instruction as Group B, also underwent the experimental treatment, which centered around self-instruction. The following limitations were imposed on the music and classroom teachers:

1. No attempts were to be made to encourage participation in the available music activities.
2. No help was to be given unless solicited by the student.
3. No special approval was to be awarded to those who were especially interested and actively engaged in projects.

These limits were imposed because of a strong opinion on the

part of the investigator that it is totally impractical to assume that classroom teachers would accept a music program that would add to their bookkeeping chores. This method of self-instruction in music operates on the basis that the student assumes the responsibility for selecting and continuing his project or area of interest, thereby freeing the teacher of undue administrative responsibilities.

Students were encouraged to plan their own projects. However, the following activities were available to the students at the beginning of the experimental period:

1. Self-instruction on piano, recorder, guitar, trumpet, xylophone, autoharp, and tone bells. Instruments and methods books were available for school use, and the smaller instruments (recorder, trumpet, and guitar) could be checked out for brief periods. In order to receive help from the teacher in tuning or playing the instrument, the student signed an "I Need Help!" chart.
2. Cassette recordings with optional worksheets and self-scoring answer cards or sheets. The recordings dealt with instrument recognition, musical style, score-watching, and the relationship of music to other art forms.
3. Suggestions for original compositions with melodic or harmonic basis; revised to include rhythmic compositions.
4. "Be the Teacher" option. A student could elect to present a particular song, record, idea, or instrument to the class or to an individual student.
5. Programmed instruction in the fundamentals of music.
6. Diagrams for constructing instruments from common household articles.
7. Contracts for various investigations involving library research or original creations.

8. Musical games obtained from the commercial market.
9. The "Sonic Staff," a device developed for this project. It features a wooden sound box displaying a treble clef and staff, with tuned strings corresponding to the lines and spaces on the staff. Transparencies were designed to slip under the strings and over the staff lines. Each transparency was accompanied by various activities related to that particular transparency. See Appendix D.

At the beginning of the experiment each student in Group A made a "log book" in which the student could write anything he wished. However, the investigator did make one request about its contents: that a list be kept of all activities in which the student participated. The students were told that there would be no praise or other rewards from the teacher for large numbers of activities nor criticism for failure to participate in activities. Frequencies of these activities are listed according to type in Appendix A. At the end of the experiment the students were asked to write comments in their logs that "would be helpful" to the investigator in revising or evaluating the program. Students were not required to write their particular opinions, but twenty-four out of twenty-five students present responded. Some of their comments appear in Appendix B.

Certain "environmental conditions" were necessary to make this type of musical activity possible. The requirements include:

1. A classroom teacher who can tolerate a variety of sounds.

2. A separate room or enterroom in which instruments can be played without interfering unduly with other activities.
3. A minimum daily allotment of twenty to twenty-five minutes during which students may select an activity.
4. Audio equipment with headsets.
5. A minimum number of instruments with cases and storage space to protect them from accidental damage.
6. Disinfectant sprays to permit different students to use the same mouthpieces. Isopropyl alcohol in a spray dispenser was recommended by pharmacists who were consulted about the level of protection offered by various disinfectant products.

At the end of the three-month experimental period, the Music Achievement Test was again administered as a post-test, and the two testings were compared for significant differences between groups.

## CHAPTER IV

### REPORTING THE DATA

The preceding chapters have dealt with the definition of the problem, a review of related literature, and the methods employed to investigate the effect of self-instruction in music. In this chapter the data obtained from the measuring instrument are reported and interpreted.

The measuring instrument used to obtain data for comparing the experimental and control groups was the Music Achievement Test.<sup>1</sup> The experimental group, designated Group A (N=27), and the control group, designated Group B (N=25), were administered a pre-test before the experimental treatment and a post-test upon completion of the treatment. Seven sub-tests were administered. They will be designated in this study as:

- Test 1 (MAT sub-test 3-1)--Tonal Memory
- Test 2 (MAT sub-test 3-2)--Melody Recognition
- Test 3 (MAT sub-test 3-3)--Pitch Recognition
- Test 4 (MAT sub-test 3-4)--Instrument Recognition
- Test 5 (MAT sub-test 4-1)--Musical Style
- Test 6 (MAT sub-test 4-3)--Chord Recognition
- Test 7 (MAT sub-test 4-4)--Cadence Recognition

The lower-case letter a designates a pre-test. Lower case b identifies a post-test.

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<sup>1</sup>First reference to this test appears on page 8.

The Music Achievement Test was selected because it measured not only music skills related to aptitude but also skills that are learned, such as recognition of style and timbre. Although the test is an outstanding example of a carefully researched music achievement test, it is most reliable at the sixth and seventh grade level, and administration of this test to fourth grade students places its reliability in question.

The data obtained in this study consisted of raw scores. These raw scores and the I.Q. scores from each student were converted by computer to standard scores (non-normalized  $T$  scores with a mean of 50 and a standard deviation of 10). This conversion provided a uniform basis of comparison between any two sets of scores. Significance of difference was accepted at the .05 level of confidence. Any departure from this figure is explained in the text.

All statistical treatments were processed by computer. The  $t$ -test of significance was computed to determine the significance of difference between means.

The raw data (test and I.Q. scores) were first computerized to obtain standard scores. This treatment also produced other data based on raw scores including mean, standard deviations, standard error of measurement, and range (Table 1, page 33). Although the MAF Interpretive Manual provides a standard scores table,<sup>1</sup> the writer wished to

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<sup>1</sup>Colwell, Interpretive Manual, op. cit., p. 117 and pp. 183-184.

TABLE 1  
 MEASURES OF CENTRAL TENDENCY AND VARIABILITY  
 BASED ON MAT RAW SCORES AND I.Q. SCORES  
 OF FOURTH GRADE STUDENTS IN STUDY

	Variable	Number	Mean	S. D.	S. E.	High	Low
1.	I.Q.	46	109.00	13.01	1.92	144	80
2.	Test 1a	47	7.98	4.46	0.65	20	1
3.	Test 1b	51	6.71	4.44	0.62	16	1
4.	Test 2a	47	6.15	2.54	0.37	16	2
5.	Test 2b	51	7.67	2.86	0.40	14	3
6.	Test 3a	50	6.04	2.88	0.41	14	1
7.	Test 3b	51	5.53	2.25	0.32	13	2
8.	Test 4a	50	4.20	1.74	0.25	8	1
9.	Test 4b	51	4.71	2.15	0.20	9	1
10.	Test 5a	51	12.16	4.25	0.59	21	3
11.	Test 5b	49	11.69	3.83	0.55	23	5
12.	Test 6a	51	6.82	3.25	0.46	14	1
13.	Test 6b	50	5.66	3.00	0.42	14	1
14.	Test 7a	51	5.37	2.26	0.32	10	1
15.	Test 7b	51	5.27	2.55	0.36	14	1



investigate the relationship between the two sample groups only, not the relationship of the groups to a larger population. Therefore, all references to standard scores apply only to the groups tested, not to the norms established by Dr. Colwell.

Since the two groups were independent intact classrooms and thus not randomly selected, the precaution of testing the significance of I.Q. scores was taken. Application of the t-test produced evidence that no significant differences in I.Q. existed between Group A and Group B, as indicated by a t-score of 1.1447 ( $P = 0.2574$ ).

The t-test disclosed that a greater number of significant differences occurred in pre-test results between Group A and Group B than in post-test results (Table 2, page 35). Significant differences occurred between Group A and B in pre-tests 2a, 3a, and 6a. A significant difference occurred in one post-test, Test 1b ( $P = .0004$ ). A confidence level of .0632 in Test 7b suggests that a significant difference exists in this category, although this probability falls short of the level of confidence (.05) established by the investigator. In all of the cited significant differences, Group A was superior to Group B.

Although Group A shows superiority in almost all test results as compared with Group B, comparison of pre- and post-test scores of Group A shows a gain in three sub-tests and a loss in four sub-tests (Table 3, page 36). The

TABLE 2  
 DIFFERENCES BETWEEN GROUP MEANS ON  
 PRE-TEST AND POST-TEST SCORES

TEST	GROUP A	GROUP B	t	df	P
PRE-TEST					
1. Tonal Memory	51.88	47.86	1.3692	46	.1745
2. Melody Recognition	53.00	46.00	2.5205	46	.0146
3. Pitch Recognition	53.37	45.87	2.7778	49	.0077
4. Instrument Recognition	51.44	48.34	1.0768	49	.2869
5. Musical Style	52.07	47.58	1.6225	50	.1073
6. Chord Recognition	52.80	46.92	2.1136	50	.0374
7. Cadence Recognition	50.61	49.20	.4971	50	.6270
POST-TEST					
1. Tonal Memory	54.88	45.00	3.9890	50	.0004
2. Melody Recognition	48.58	51.76	1.1291	50	.2634
3. Pitch Recognition	50.42	49.64	.2743	50	.7814
4. Instrument Recognition	50.23	49.56	.2360	50	.8093
5. Musical Style	52.46	47.72	1.6798	48	.0959
6. Chord Recognition	50.48	49.24	.4264	49	.6752
7. Cadence Recognition	52.65	47.40	1.1768	50	.0632

TABLE 3  
DIFFERENCES IN MEANS WITHIN EACH GROUP

	GROUP A					GROUP B				
	Pre-test	Post-test	Diff- erence	+	-	Pre-test	Post-test	Diff- erence	+	-
1.	51.88	54.88	+3.00	X		47.86	45.00	-2.86		X
2.	53.00	48.58	-4.42		X	46.00	51.76	+5.76	X	
3.	53.37	50.42	-2.95		X	45.87	49.64	+3.77	X	
4.	51.44	50.23	-1.21		X	48.34	49.56	+1.22	X	
5.	52.07	52.46	+0.39	X		47.58	47.72	+0.14	X	
6.	52.80	50.48	-2.32		X	46.92	49.24	+2.32	X	
7.	50.61	52.65	+2.04	X		49.20	47.40	-1.80		X

same comparison applied to Group B shows a gain in achievement in five sub-tests and a loss in two sub-tests. The fluctuation in pre- and post-test scores of both groups is attributed to the low reliability of this test at the fourth grade level.

A significant difference (.0004) occurred in Test 1b, Tonal Memory, favoring Group A. Test 7b, Cadence Recognition, approached the designated level of confidence with a probability of .0632. Test 1 and Test 7 are related, since both measure the ability to perceive chordal characteristics.

No other tests approached the designated level of confidence established by the investigator. However, in

Test 5, Musical Style, a probability of .10 in the pre-test and .09 in the post-test, favoring Group A, indicates that there is a consistent difference between the two groups, although at a greater likelihood of being attributed to chance.

Summary. Raw data from MAT test scores and student I.Q. scores were computerized to determine significance of differences between experimental Group A and control Group B by means of the t-test. Differences were tested between groups on pre- and post-test scores, as well as I.Q. scores.

No significant differences existed between Group A and Group B in relation to I.Q. scores. Because of the low reliability of the measuring instrument at the fourth grade level, results of the testing were inconclusive. However, the high level of significance (.0004) in Test 1b seems to indicate that a real difference does exist in favor of Group A. A probability of .0632 suggests that a significant difference exists in Test 7b, also favoring Group A.

Based on the results of the interpreted data, there appears to be a relationship between achievement in the two sub-tests related to chord structure and the activities of the experimental group, Group A. There seems to be no relationship between Group A's activities and the remaining sub-tests.

## CHAPTER V

## SUMMARY AND CONCLUSIONS

The purpose of this study was to determine the effect of self-instruction on music achievement at the fourth grade level.

A review of the literature identified individualized instruction and independent study as two widely accepted methods of self-instruction, with the former characterized by varying degrees of teacher direction. Studies defining musical concepts were in agreement that melody, rhythm, and harmony were basic to the understanding of music, but there was a lack of consensus regarding the acceptance of timbre,agogics, mood, form, and style. Musical concepts could not be categorized by grade levels; rather, each child must enter the learning cycle at his own level of ability. Methods and measurements were examined to devise a procedure for initiating elementary school music instruction that could be self-directed and organized around sequential development of musical concepts.

To test the effect of self-instruction, two groups were compared. Both received group music instruction, but the experimental section also participated in self-directed

music activities. Self-instruction was made possible by various materials, including musical instruments, recordings, programmed instruction, study contracts, and musical games. Students were individually responsible for selecting and completing their activities with little or no assistance or insistence from teachers. Pre- and post-tests were administered to measure the difference between groups before and after the experimental treatment. I.Q. scores were also compared.

The t-test of significance applied to the data found no significant differences between the two groups in I.Q. Extreme fluctuation in pre- and post-test scores on the Musical Achievement Test indicated that the test was not reliable at the fourth grade level. Therefore, the t-test results were not conclusive because of the low level of reliability in this testing situation. The results of the tests were considered to be only indications of a trend rather than decisive differences between the two groups.

The post-test significances of Test 1 and the near-significance of Test 7 were attributed to the frequent selection of chordal activities by many students in Group A. The self-instructional activities appeared to have no effect on other test scores.

#### CONCLUSIONS

Analysis of the data resulted in the following conclusions:

1. The significant relationship existing between post-test scores related to chord structure indicate that independent activities of students can produce measurable results in achievement. Student record books described in Chapter III, page 29, indicate that many students spent a disproportionately large amount of their available time playing instruments that were chordal in nature: guitar, autoharp, tone bells, and xylophones. It appears that the self-initiated practice of these students in this one area had a highly significant effect on their achievement.
2. Socio-economic factors may influence ability to distinguish differences in musical style. The results of Test 5, Musical Style, suggest that the differences between the groups in parental occupations may be related to their achievement in this sub-test, since there is a correlation between musical tastes and parental occupation.<sup>1</sup>
3. Children tend to select activities that involve manipulation (games and instruments) and sound production.
4. Paper-pencil activities in music are rarely selected by fourth-grade children when other options are available.
5. Frequency of listening activities requiring the use of cassette is related to the quality and accessibility of audio equipment and to the regulations established in school learning centers.
6. Some students desire more extensive teacher involvement than is allowed in this model of self-instruction.
7. Most students at the fourth grade level display enthusiastic and confident responses to activities of their own choosing, often wishing to display their efforts before their entire group.

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<sup>1</sup>Thomas W. Watson, "A Study of Musical Attitudes and Their Relationship to Environment among Rural Socio-Economically Deprived Students in Central Oklahoma" (unpublished doctoral dissertation, University of Oklahoma, 1968), p. 76.

6. Most musical concepts can be adapted in some form to self-instruction and can be used in a supplementary method to traditional group instruction.

#### RECOMMENDATIONS FOR FURTHER STUDY

Further experimentation with self-instruction in music at the elementary school level is necessary in order to develop successful materials and conditions best suited to this type of instruction. Considerations for further study should include:

1. An enlargement of this study to include a larger sample and a longer period of investigation.
2. The design of a test which would be a reliable, valid measure of the level of achievement of the children being studied, based on their own particular musical experiences.
3. Development of materials that not only would be based on logical learning sequences but that would also include manipulative and colorful features as an integral part of their design.
4. Pre-arranged agreements with learning center co-ordinators that would permit children to use equipment themselves after proper instruction.
5. A modification of the experimental design that would allow more teacher-direction for the student who is hesitant or inexperienced in self-direction.
6. A strong inter-relationship with the group-instructional music program to allow more performance opportunities for individuals and small groups and to better re-inforce musical concepts.

It is the opinion of the writer that self-instruction in elementary school music has merit and should be considered



as a potentially effective means of supplementary music instruction. Children deserve the chance to "discover" music for themselves.

APPENDIXES

APPENDIX A

FREQUENCY OF ACTIVITIES RECORDED  
IN STUDENT LOG BOOKS

Chordal Activities	
Autcharp	65
Guitar	48
Tone Bell Chords	39
Play "in a group"	<u>38</u>
Total	190
Instrumental Activities	
Playing Instruments	51
Making Instruments	<u>9</u>
Total	60
Listening Activities Using Cassettes	28
Programmed Materials	20
Musical Games	65

APPENDIX B

SELECTED COMMENTS FROM STUDENT LOG BOOKS

"I liked most of all going to play the instruments. It made me more familiar with them. What I really hated was doing those things like 'Staffs 'n Stuff' (programmed materials). I played 'Play the Beats' a million times (a musical game)."

"The instrument I like best is the guitar. I like it because you can make more chords and sounds. I don't like to get into groups and make rhythms. Otherwise, I love music."

"At the other school we had baby stuff in music, that's why when I came here I never knew about cords (sic) and I was too shy to ask you about it."

"I wish I could have gotten more chances to listen to the tapes. I like playing the autoharp best."

"I liked best playing in our 'band.' I hated the Program Material."

"I like to read books about composers . . . I have started to look for music that they wrote. I really liked everything."

"For some reason I have liked music this year than any other year (sic). I have learned more in music than I ever had before. The two instruments I liked the most were the autoharp and the recorder."

"I have been learning to play the trumpet. I know all the keys in the trumpet. One time I tried to play taps (sic) but I only got the first part and the second part sounded crummy . . . I hope I will be good when George (another student) finishes helping me."

## APPENDIX B (continued)

"Martin and I wrote a song called 'Music is a splended thing (sic). I liked everything we did in Music but I did not like it when somebody played too lous."

"I know lots more about notes and time and counts and things. I do not like the noise of the trumpet . . . I liked music best of all my years of 1, 2, 3, 4."

"I think Steve and I did a beautiful job on music is a splindred thing."

APPENDIX C

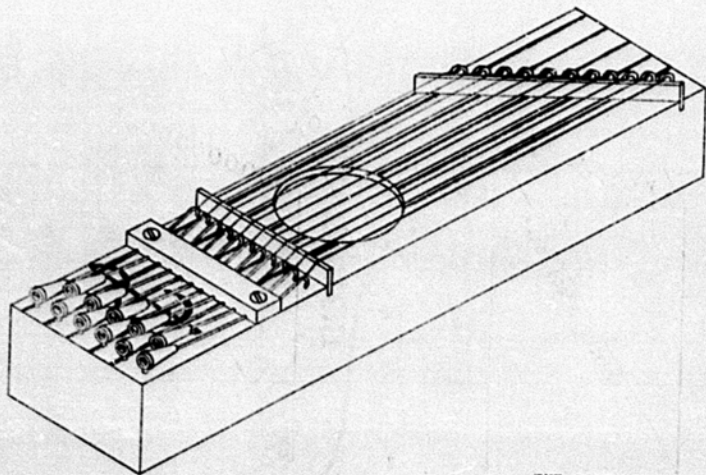
MATERIALS AND REFERENCES THAT COULD BE  
USED IN PLANNING AND IMPLEMENTING A  
SELF-INSTRUCTIONAL MUSIC PROGRAM

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## APPENDIX C (continued)

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67



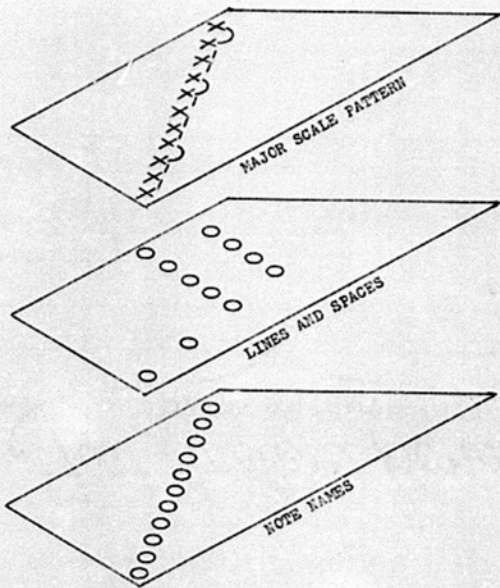
APPENDIX D

THE SONIC STAFF

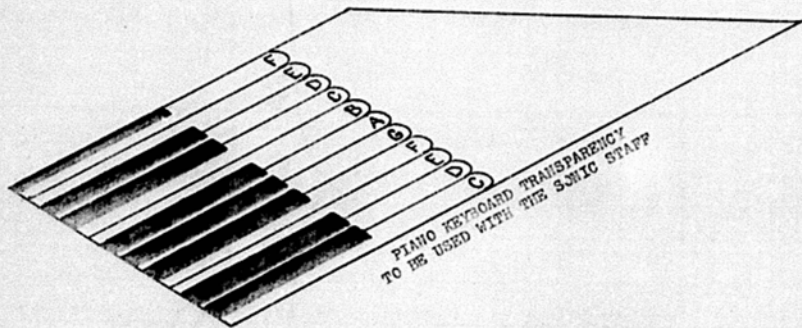
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## APPENDIX D (continued)

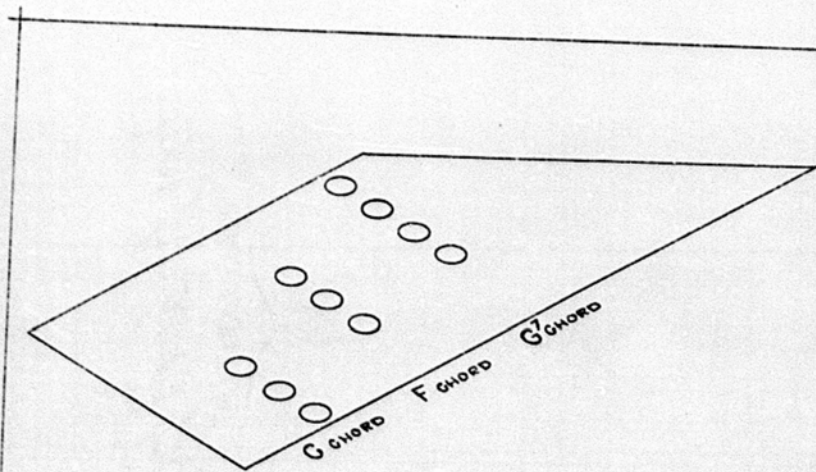


TRANSPARENCIES TO BE USED WITH THE SONIC STAFF



PIANO KEYBOARD TRANSPARENCY  
TO BE USED WITH THE SONIC STAFF

EACH TRANSPARENCY IS INSERTED UNDER THE STRINGS OF THE SONIC STAFF. THE TREBLE CLEF SIGN, LINES AND SPACES ARE VISIBLE THROUGH THE TRANSPARENCY. MORE THAN ONE TRANSPARENCY CAN BE USED AT ONE TIME, IF DESIRED.



CHORD STRUCTURE TRANSPARENCY  
TO BE USED WITH THE SONIC STAFF

## APPENDIX E

## CODING INSTRUCTIONS FOR RAW DATA

COLUMN	DATA	TUNCH
1	Group A (Experimental)	1
	Group B (Control)	2
2-3	Student I.D. Number	
4-6	I.O. Score	
11-12	Test 1a (raw score)	
13-14	2a	
15-16	3a	
17	4a	
18-19	Total	
20-21	Test 1b	
22-23	2b	
24-25	3b	
26	4b	
27-28	Total	
29-30	Test 5a	
31	Unused data	
32-33	Test 6a	
34-35	Test 7a	
36-37	Total	
38-39	Test 5b	
40	Unused data	
41-42	Test 6b	
43-44	Test 7b	
45-46	Total	

a = pre-test

b = post-test

The raw data obtained from the achievement tests was placed on cards which were run through Program No. R002 at the computer center at Western Kentucky University. This program produces a standard score deck and the information contained in Table 1, page 31.

## APPENDIX E (continued)

## LOCATION OF VARIABLES ON STANDARD SCORE DECK

COLUMN	VARIABLE
11-12	I.C.
13-14	Test 1a
15-16	Test 2a
17-18	Test 3a
19-20	Test 4a
21-22	Total
23-24	Test 1b
25-26	Test 2b
27-28	Test 3b
29-30	Test 4b
31-32	Total
33-34	Test 5a
35-36	---
37-38	Test 6a
39-40	Test 7a
41-42	Total
43-44	Test 5b
45-46	---
47-48	Test 6b
49-50	Test 7b
51-52	Total

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