THE EFFECTS OF SELECTED FACTORS AND INDIVIDUAL INSTRUCTION WITHIN THE MUSIC CLASSROOM ON THE PERFORMANCE ACHIEVEMENT OF SEVENTH GRADE BEGINNING INSTRUMENTALISTS

Thesis for the Degree of Ph. D.

MICHIGAN STATE UNIVERSITY

JAMES FRANCIS McCARTHY

1972

This is to certify that the

thesis entitled

The Effects of Selected Factors And Individual Instruction Within The Music Classroom On The Performance Achievement of Seventh Grade Beginning Instrumentalists

presented by

James Francis McCarthy

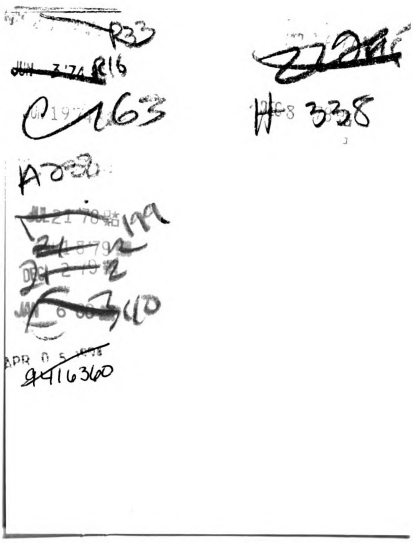
has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Music

Robert G. Sidnell

Robert G. Sidnell
Major professor

Date 11-10-92



ABSTRACT

THE EFFECTS OF SELECTED FACTORS AND INDIVIDUAL INSTRUCTION WITHIN THE MUSIC CLASSROOM ON THE PERFORMANCE ACHIEVEMENT OF SEVENTH GRADE BEGINNING INSTRUMENTALISTS

By

James F. McCarthy

This study investigated the effect of tutorial instruction within the music classroom on the performance achievement of male and female instrumental beginners relative to their varying levels of I.Q., academic achievement, attitude towards music, musical aptitude, and personal adjustment.

The main hypothesis was that beginning instrumentalists of both sexes who are taught individually within the classroom will earn significantly higher scores on performance achievement than their counterparts under ensemble instruction. It was further hypothesized that students of high I.Q., grade point average, attitude towards music, musical aptitude, and personal adjustment

will earn significantly higher scores on performance achievement than students of low I.Q., GPA, attitudes towards music, musical aptitude, and personal adjustment. Finally, it was hypothesized that a significant effect on performance achievement would occur as a result of the interaction between the conditions of instruction and the five variables listed above.

Procedure. Two groups of subjects comprising the total enrollment of beginning instrumentalists (less three students with prior instrumental training) from two Lansing, Michigan schools participated in the study. Students in the experimental group (N = 45) were dispersed about the classroom for the purpose of self-drill, and they exclusively received tutorial instruction and evaluation only when they requested it, or when they wished to progress to a succeeding unit (page) in their text. Later, when a student had acquired the cognitive and aural skill necessary for competent self-evaluation, he was allowed to proceed from unit to unit at his own discretion.

Students in the control group (N = 45) were taught by the "ensemble" method in which the rate of unit progression is governed for all students by the teacher, and which is characterized by simultaneous and repetitious

drill. Both groups used the same text, and the period encompassing the study was one school year.

Data concerning I.Q., grade point average, attitude towards music, musical aptitude profile, and personal adjustment were obtained for both groups from school records or by pre-testing. Scores on the dependent variable, performance achievement, were obtained by recording each student's performance on the Watkins-Farnum Performance Scale, and submitting those recordings to an independent judge.

Results. Correlation coefficients were computed between the subject variables of I.Q., GPA, attitude towards music, musical aptitude profile (MAP), and personal adjustment. The similarities of these relationships between the experimental and control groups, the failure of analyses of variance to establish any significance for the small differences between paired means, and the lack of any significant differences when those variables were dichotomized by sex, led to the conclusion that the subject variables, by themselves, would not account for differences in scores on the dependent variable of performance achievement.

Analysis of the data pertaining to the dependent variable, performance achievement, yielded the following results:

1) Students who received individual instruction were superior, in terms of performance achievement, to students receiving ensemble instruction. The difference was statistically significant at the .025 level of confidence.

2) The performance achievement for all students of higher levels of I.Q., GPA, MAP, and personal adjustment was superior to students with lower levels of similar variables. The differences were significant at the .001, .001, .01, and .01 levels of confidence, respectively.

3) The interaction of instructional conditions and 1) I.Q., 2) attitude towards music, and 3) personal adjustment was found to be significant at the .025, .05, and .01 levels of confidence, respectively.

4) No statistical significance could be attached to the effect on performance achievement of attitude towards music, sex of the students, or the interaction of GPA levels and instructional conditions.

THE EFFECTS OF SELECTED FACTORS AND INDIVIDUAL INSTRUCTION WITHIN THE MUSIC CLASSROOM ON THE PERFORMANCE ACHIEVEMENT OF SEVENTH GRADE BEGINNING INSTRUMENTALISTS

By

James Francis McCarthy

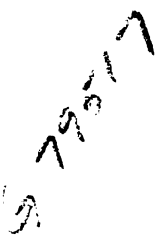
A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Music

1972



To Carol and James

ACKNOWLEDGMENTS

The writer expresses sincere appreciation for the assistance which has been given him by each of the members of his doctoral committee: Dr. Robert Sidnell, Chairman, Dr. Merle Sherburn, Professor Robert Unkefer, and Professor Richard Klausli. Special appreciation is due Dr. Sidnell for his generous sharing of time, effort and experience in bringing this study to its final form.

The impact of Professor Richard Klausli's intellectual and personal influence on the writer can only be acknowledged; expressions of gratitude are inadequate.

Finally, appreciation is due my wife, Carol, for her support and forbearance.

TABLE OF CONTENTS

TABLE OF CONTENTS (cont'd.)

LIST OF TABLES

LIST OF TABLES (cont'd.)

LIST OF FIGURES

CHAPTER I

INTRODUCTION

One of the most striking characteristics of a classroom is the wide variations in ability and achievement demonstrated by its pupils, even within a group possessing a common history of educational experiences. The scenario of individual differences faced by the classroom teacher each morning is further embellished by the frequent shifts in attitudes and motivations within students. Students not only differ from each other but also within themselves from day to day and from situation to situation as well.

Consequently, the "lecture-discussion" method of teaching common to most classrooms can be deemed an efficient manner of broadcasting information only if the processes of reception are ignored. All too frequently, teachers assume that every child receives sensory data in

the same manner. Minor,[1] working with children who have learning difficulties, found a wide range of sensory preferences, even in children whose complete sensory equipment was intact. For some, kinesthetic experiences were utilized to reinforce visual and aural perception, while others were unable to shift easily from one sensory mode to another. Given the broad categories of hereditary, maturational, environmental, and glandular differences to which recognizable trait variabilities can be ascribed, it would be difficult to imagine the lecture-discussion mode of teaching as a viable system for transferring knowledge.

Instructional programs in the United States which attempt to shift the burden of adaptation from the student to the teacher began to be developed in the latter decades of the 19th Century.[2] Efforts to relax the rigid conformity of the traditional lock-step system were given support by the appearance, shortly after the turn of the century, of psychometric tools and techniques which

---

[1]Frances Minor, "A Child Goes Forth: Ideas Invite Involvement," Individualizing Instruction (Washington, D.C.: Association for Supervision and Curriculum Development, National Education Association, 1964), p. 58.

[2]Chester W. Harris, ed., Encyclopedia of Educational Research (New York: Macmillan, 1960), p. 222.

attempted to quantify the scope of trait variability. The increasing sophistication of these tools has recently established new parameters of human competence and performance. It is now clear that students differ widely not only in intelligence but in creativity[3] and in at least eighty elements of intellect.[4] It has also been demonstrated that these inequalities increase rather than decrease as a student moves through the grades. Among ninth graders, reading and mathematics test scores may range from grade three to college junior levels.[5] Yet mass teaching continues, seemingly oblivious to its inappropriateness.

The Problem and Purposes of the Study

This study was concerned with formulating and evaluating a method of individual instruction which will provide learning conditions compatible with the physiological and psychological differences that individuals

---

[3] M. A. Wallach and N. Kogan, Modes of Thinking in Young Children (New York: Holt, Rinehart and Winston, Inc., 1965).

[4] J. P. Guilford, The Nature of Human Intelligence (New York: McGraw Hill, 1967).

[5] R. M. Thomas and S. M. Thomas, Individual Differences in the Classroom (New York: David McKay Company, Inc., 1965), p. 3.

bring to beginning instrumental music classes. More specifically, the purpose of this study is to compare the effects, on the performance achievement of beginning junior high school instrumental music students, of both individual instruction within a class and ensemble instruction of a more traditional nature. Further objectives were:

1. to determine the effect of students' intelligence, academic achievement, attitude towards music, musical aptitude, and personal adjustment on their scores for the dependent variable, performance achievement.
2. to examine the differing effects on performance achievement which may occur as a result of the interaction between the two instructional treatments and the five subject variables of intelligence, academic achievement, attitude towards music, musical aptitude, and personal adjustment.

Hypotheses

The primary hypothesis of this study is that individual instruction in the experimental classrooms will produce significantly higher scores on performance achievement for beginning instrumentalists than a

traditional ensemble method of teaching in the control classes, and that this difference will occur regardless of the subject's sex. In addition, it is hypothesized that students with higher levels of intelligence, scholastic achievement, attitude toward music, musical aptitude, and personal adjustment will attain significantly higher performance achievement scores than students at lower levels of the same variables. It is further hypothesized that significant interaction effects on performance achievement will be found occurring between types of instruction and levels of the aforementioned subject variables.

Investigation of these hypotheses necessitates examination of the following null hypotheses:

1. There is no significant difference in performance achievement between the experimental and control groups.
2. There is no significant difference between males and females within the experimental and control groups, respectively, in performance achievement.
3. There is no significant difference in performance achievement between students of low, medium, and high I.Q.

4. There is no significant difference in performance achievement between students of low, medium, and high grade point average (GPA).
5. There is no significant difference in performance achievement between students of low, medium, and high attitude towards music.
6. There is no significant difference in performance achievement between students of low, medium, and high musical aptitude.
7. There is no significant difference in performance achievement between students of low, medium, and high personal adjustment.
8. There is no significant interaction effect on performance achievement between the instructional treatment and each of the subject variables of intelligence, academic achievement, attitude towards music, musical aptitude, and personal adjustment.

Need for the Study

A fundamental premise of educational principle is that each child should be able to develop from his current level of achievement to another level of competency in a manner suitable to his particular needs. Unfortunately,

music classes devoted to instrumental instruction typically demonstrate the inequality engendered by the equal treatment of students of unequal ability. The instructional procedures found therein are best described by Froseth as "lock-step, where all students in the class play (rehearse) each exercise until the slower members of the class succeed or until the teacher gives up. No doubt, learning by imitation (i.e., once through to see how it goes, or follow the leader) and other forms of musical dependency and musical illiteracy can be attributed to a lock-step approach to teaching beginning instrumental music."[6]

The inefficiency of simultaneous, repetitious, identical learning tasks for all students is patently obvious, particularly for those of higher ability. The latter, unable to benefit from the "overlearning" inherent in such drill (see studies by Becker[7] and

---

[6]James O. Froseth, "Individualizing Instruction in the Beginning Music Class" (unpublished paper presented at the North-Central Division MENC Convention, Research Section, 1971), p. 2.

[7]W. R. Becker, "The Effect of Overlearning, Initial Learning Ability and Review upon the Musical Memory of Junior High School Cornet and Trumpet Players" (unpublished Ph.D. dissertation, State University of Iowa, 1962).

Rubin-Rabson,[8] cited in Chapter II), must feel an overwhelming sense of frustration resulting from their entrapment by an instructional procedure virtually designed to waste their time and insure their boredom. Likewise, the student of lower intellectual or musical ability, perhaps already imbued with the expectation of failure, finds the pace of instruction too rigid, the evaluatory systems employed by a teacher ineffectual and inappropriate to his needs. He may experience frustration and seek defense against it by turning away from the initial excitement and aspirations characteristic of most beginners, and may ultimately "tune-out" the source of irritation by dropping out at his earliest opportunity. There is some evidence (Kruth,[9] Bergen,[10] and

---

[8]Grace Rubin-Rabson, "Studies in the Psychology of Memorizing Piano Music VI: A Comparison of Two Forms of Mental Rehearsing and Keyboard Overlearning," Journal of Educational Psychology, XXXII (1941), 593-602.

[9]E. C. Kruth, "Student Drop-Out in Instrumental Music in the Secondary Schools at Oakland, California" (unpublished Ph.D. dissertation, Stanford University, 1964).

[10]Hal Bergen, "A Study of Drop-Outs in Instrumental Music in Five Selected High Schools in Michigan" (unpublished Ph.D. dissertation, Michigan State University, 1957).

Pruitt,[11] cited in Chapter II) that students of the lowest and highest ability comprise the major proportion of drop-outs from instrumental music programs. This study will attempt to prescribe an instructional method which is simple in conception, easily administered, and which will perhaps remove some cause for attrition among beginning students by providing them with instruction tailored to their needs.

While the literature contains an abundance of articles deploring the undesirable attitudes engendered in students by harmful teaching techniques, one rarely finds any mention of the frustration and desperation experienced by teachers. Instructors often discover that they are unable to fulfill their best intentions of bringing knowledge and intellectual excitement to children, particularly children far removed from the class, culture, or race of that teacher. In a filmed documentary examination of communication in schools produced by the BBC television network, the too-typical, agonizing conflict between teachers who pursue their instructional goals with

---

[11] Jack S. Pruitt, "A Study of Withdrawals in the Beginning Instrumental Music Programs of Selected Schools in the School District of Greenville, South Carolina" (unpublished Ph.D. dissertation, New York University, 1966).

sincerity and dedication and students who resist the teacher's efforts with considerable determination and occasional cruelty was described as a "war: sometimes cold, sometimes hot, with undeclared periods of truce or rarer periods of peace, but always--a war."[12] This conflict between teachers and students is presumed to be partially caused by patterns of communication which result from the roles adopted by the participants in the traditional lecture-discussion classroom. Such roles involving the formal dissemination and reception of information are often inimicable to the establishment of productive relationships. If communication is primarily between "the teacher" and "the class," it is likely that such a relationship will be marked by distance, suspicion, alienation, and occasional hostility. Conversely, if teaching is carried out on a tutorial basis, the prime mode of communication is between two individuals, and their personal relationship may become supportive, thus defusing the source of the conflict between the two roles.

---

[12] "Communication," BBC Telecast, May 12, 1972: "The School."

Definition of Terms

Performance Achievement is the ability to perform on the appropriate musical instrument as measured by the Watkins-Farnum Performance Scale.[13] The test provides for the measurement of errors in pitch, tempo, rhythm, duration, expression, slurs, rests, pauses, and repeats.

Intelligence is measured by the Otis-Lennon Mental Ability Test, Intermediate Level.[14] According to the authors, the test has "been designed to provide comprehensive, carefully articulated assessment of the general mental ability, or scholastic aptitude, of pupils in American schools. Emphasis is placed upon measuring the pupil's facility in reasoning and in dealing abstractly with verbal, symbolic, and figural test content sampling a broad range of cognitive abilities."[15]

Scholastic Achievement is defined as the success attained by students in scholastic endeavors as evidenced

---

[13] John Watkins and Stephen Farnum, The Watkins-Farnum Performance Scale (Winona, Minnesota: Hal Leonard Music, Inc., 1965).

[14] Arthur Otis and Roger Lennon, Otis-Lennon Mental Ability Test, Intermediate Level (New York: Harcourt, Brace and World, Inc., 1967).

[15] Arthur Otis and Roger Lennon, Otis-Lennon Mental Ability Test: Manual for Administration (New York: Harcourt, Brace and World, Inc., 1967), p. 4.

by their respective grade point averages (GPA). These averages were computed for all curricular courses taken by students prior to the inception of this study, but exclude all grades received during the experimental period.

Attitude Towards Music is defined as the cognitive component of the students' affective behavior in music. It is measured by the Thurstone-Chave[16] "method of equal-appearing intervals" scale developed by Carter.[17]

Musical Aptitude is best defined as general musical abilities which are a product of inherited potential and environmental influences. Since all aptitude tests are to some degree a measure of acquired learning, an aptitude test may be distinguished from an achievement test to the extent that the generalized function of aptitude is maximized, and the specifically learned course-content material is minimized.

---

[16]Louis L. Thurstone and E. J. Chave, The Measurement of Attitudes (Chicago: University of Chicago Press, 1929).

[17]Warrick Carter, "Ethnic Music as a Source for the Musical Development and Enrichment of Culturally Different Students in General Music Classes" (unpublished Ph.D. dissertation, Michigan State University, 1970).

The measure of musical aptitude is the composite score attained by all students on the Musical Aptitude Profile (MAP).[18] According to the author, the test is designed to "minimize musical achievement so that the most basic factors of musical aptitude--aural perception, kinesthetic musical feeling, and musical expression--may be adequately assessed."[19]

Personal Adjustment is defined as feelings of personal security, and refers to the manner and effectiveness with which the whole individual meets his personal needs. The measure of personal adjustment is the composite score attained by students on the personal adjustment section of the California Test of Personality, Intermediate Level.[20] According to the authors, the test is designed to "detect the areas and specific types of tendencies to think, feel, and act which reveal undesirable individual adjustments."[21]

---

[18]Edwin Gordon, Music Aptitude Profile (Boston: Houghton-Mifflin Co., 1965).

[19]Idem., "The Musical Aptitude Profile," Music Educators Journal, 53:6 (February, 1967), 52.

[20]Louis Thorpe, Willis Clark, and Ernest Tiegs, California Test of Personality (Monterey: CTB/McGraw-Hill, 1953).

[21]Louis Thorpe, Willis Clark, and Ernest Tiegs, Manual: California Test of Personality (Monterey: CTB/McGraw-Hill, 1953), p. 2.

Individual Instruction is defined as an exclusively tutorial, one-to-one basis of instruction involving a single teacher and student within the experimental classes. It should not be confused with "individualized instruction," which connotates the relative degree to which instruction, materials, programs, and curricula, are adapted to groups of varying sizes.*

Ensemble Instruction is defined as instruction given to students within an ensemble comprised of dissimilar wind and percussion instruments. It is characterized by identical, simultaneous, and repetitious drill instigated and concluded at the discretion of the instructor. Instruction is usually directed to the whole class, occasionally to a sub-section, e.g., similar instruments, but rarely to an individual student.*

Basic Assumptions

Conclusions which may be drawn from the analysis of data are based on the following suppositions:

1. Since only those students with no previous training in instrumental music were included in the

---

*A complete description of the individual and ensemble instructional technique used in this study can be found in Chapter III.

study, it is assumed that a pre-test on the dependent variable of performance achievement is neither necessary nor appropriate, and that students in the experimental and control groups could be equally described as naive and unskilled in terms of performance achievement.

2. It is assumed the indices of performance achievement, intelligence, scholastic achievement, attitude towards music, musical aptitude, and personal adjustment measure satisfactorily what they purport to measure.
3. It is assumed that instruction and the factors of intelligence, scholastic achievement, attitude towards music, musical aptitude, and personal adjustment bear a causal relationship to performance achievement.

Delimitations

Texts. The efficacy and appropriateness of the texts to the experimental and control methods of instruction was not examined. Texts for both groups were identical.

Level of Subjects. This study was concerned exclusively with seventh grade, beginning wind and

percussion instrumental students, and generalizations drawn from the analysis of the data will be confined to similar constraints.

Intonation. In accordance with the instructions given by the authors of the Watkins-Farnum Scale, evaluation of performance achievement did not include measurement of intonation.

Tone Quality. Although a topic involving considerable instructional effort on the part of each teacher, judgments of tone quality were not included in the test of performance achievement.

Ensemble Skills. Performance achievement was measured solely on an individual basis and no attempt was made to evaluate or compare the ensemble skills of the experimental or control group.

Further Organization of the Study

The preceding pages of this chapter have presented a statement, definition and discussion of the problem and its related aspects. The study continues in the following order: Chapter II, a Review of the Related Literature; Chapter III, Design of the Study; Chapter IV, Analysis of

the Data; and Chapter V, Summary, Findings, Discussion, Conclusions, and Recommendations.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

". . . we are not born all exactly alike but different in nature, for all sorts of different jobs."[1] Therefore Plato, recognizing the extent of human variability, specified its social implications and anticipated to a remarkable degree our century's use of aptitude batteries by proposing tests to measure traits important to the military.[2] Comenius also treated individual differences at length, admonishing teachers to consider their pupils' ages, intelligence and knowledge.[3]

In the eighteenth century, Rousseau believed the child's education should not be governed by adult

---

[1] W. H. D. Rouse, (Translator), Great Dialogues on Plato (New York: The New American Library, Mentor Books, 1956), p. 166.

[2] Ibid.

[3] J. A. Komensky, The Analytical Didactic of Comenius (Chicago: University of Chicago Press, 1953), pp. 160-164.

interests and activities, and that "the needs and interests of the individual are above those of organized society."[4] Pestalozzi insisted that the natural curiosity of a child should provide the motives for learning, and he founded, in the early nineteenth century, a boys' boarding school wherein coercion to learn was not used. Believing that free expression would allow the natural powers of the child to develop, he maintained that a teacher's responsibility was to adapt instruction to each individual according to his changing nature as required by the varying stages in his development.[5]

Thus the recognition of individual differences and the provision of appropriate individualized instruction--the problem central to this study--is neither unique to this century nor to this country.

In pre-1850 America, formal education was generally available only to a relatively small number of people. Most schools were therefore ungraded, and learning in the one-room school was very much an individual

---

[4]S. E. Frost, Jr., History of Education (Woodbury, New York: Barrows Educational Series, Inc., 1947), p. 139.

[5]Caroll Atkinson and Eugene Maleska, The Story of Education (New York: Bantam Books, 1962), p. 79.

affair.[6] But the subsequent pressure of a rapidly expanding population combined with its concentration in the cities lead to the abandonment of low student-teacher ratios and the adoption of more efficient and uniform "production" techniques.

Opposition to uniformity of curriculum and students was expressed by many educators, including Charles W. Elliot, chairman of the Committee of Ten and former President of Harvard University, when he said in 1892:

> Uniformity is the curse of American schools. That any school or college has a uniform product should be regarded as a demonstration of inferiority, of incapacity to meet the legitimate demands of a social order whose fundamental principle is that every career should be open to talent. Selection of studies for the individual, instruction addressed to the individual . . . , and diversity of product as regard to age and acquisitions must come to characterize the American public school, if it is to answer the purposes of a democratic society.[7]

Many programs proposed before and after Elliot's remarks are referred to as "individualized." Others exhibit the characteristics but do not bear the title.

---

[6]Robert G. Scanlon and John Bolvin, Individually Prescribed Instruction (Philadelphia: Research for Better Schools, Inc., 1969), p. 2.

[7]Charles W. Elliot, "Shortening and Enriching the Grammar School Course," in Charles Elliot and Popular Education, ed. by Edward Krug (New York: Teachers College Press, 1961), pp. 55-56.

All of these programs constitute a diverse family based on differing interpretations of individualizing, justified by varying theories, influenced by increasingly sophisticated technology, and confounded by the ambiguity of their label. "In fact, the term individualized instructional program is used to describe such a varied assortment of curricula that it is no longer a useful, restrictive category of instructional methods. It likely never was."[8]

A survey of these programs, even excluding pre-nineteenth century forms and those designated for such specific subject areas as reading, reveals that attempts to individualize instruction have been a facet of American education almost from its inception, and that the renewed interest has taken a bewildering array of forms.

Types of Programs

Correspondence Courses. One of the first programs in this country for individualized instruction was instituted in 1873, taking the form of what is contemporarily called correspondence courses. In 1882 a systematic plan was adopted for the study of foreign languages in which weekly

---

[8]Maurice Gibbons, Individualized Instruction (New York: Teachers College Press, 1971), p. 2.

assignments of reading and translating sent to the student were corrected by the teacher "with notes and suggestions adapted to his needs."[9] A recent Carnegie Corporation study showed that nearly five million students were enrolled in correspondence courses.[10]

Grouping Plans. The literature describes a large number of more or less pervasive procedures and devices, such as self-teaching materials, "enrichment" or supplementary assignments, differential assignments, workbooks, independent study, supervised study, personal programs, administrative plans and various grouping arrangements. Each of the categories listed above may in practice involve superficial one-shot innovations or serious and radical modifications of school organizations. Each may involve a myriad of forms: Shane[11] catalogued thirty-five methods of grouping practices alone in the United States, e.g.

---

[9]John S. Noffsinger, Correspondence Schools Lyceums, Chautaquas (New York: Howard MacMillan, 1926), p. 10.

[10]B. H. Pearse, "The Postman is the Proctor," American Education, III (February, 1967), 10-12.

[11]H. G. Shane, "The School and Individual Differences," Individualizing Instruction, Sixty-first Yearbook of the National Society for the Study of Education, Part I (Chicago: The University of Chicago Press, 1962), pp. 20-22.

up-graded groups, primary-intermediate grouping, grade level grouping, homogeneous grouping, x-y-z grouping, intrasubject-field grouping, and departmental grouping.

The grouping of students is usually an attempt to provide for individual differences by minimizing them within a classroom. Homogeneous grouping is defined by the Dictionary of Education[12] as "the classification of pupils for the purpose of forming instructional groups having a relatively high degree of similarity in regard to certain factors that effect learning." In a 1932 survey of 432 schools, Billet[13] found homogeneous grouping to be the most popular method of improving the teaching and learning environment. Harap reported a few years later that ability grouping was "the most common method of adjusting learning to individual differences."[14] A

---

[12]Carter B. Good, ed., Dictionary of Education (2nd ed.; New York: McGraw-Hill, 1959), p. 255.

[13]Roy O. Billet, The Administration and Supervision of Homogeneous Grouping (Columbus, Ohio: Ohio State University Press, 1932).

[14]H. Harap, "Differentiation of Curriculum Practices and Instruction in Elementary Schools," The Grouping of Pupils, Thirty-fifth Yearbook of the National Society for the Study of Education, Part I (Bloomington, Illinois: Public School Publishing Co., 1936), p. 163.

comprehensive review of grouping practices and research can be found in the book edited by Yates.[15] Sponsored by the UNESCO Institute for Education, the study reports the results of grouping in various countries and lists seventeen varieties of grouping in primary and secondary schools.

Relative to academic achievement, research dealing with homogeneous groupings has produced qualified and contradictory results. In an early critique, Rock reviewed only studies he considered "scientific" and concluded that:

> The experimental studies of groupings which have been considered fail to show consistent, statistical or educationally significant differences between the achievement of pupils in homogeneous groups.[16]

Likewise, Miller and Otto found that "so far as academic achievement is concerned, there is not clear-cut evidence that homogeneous grouping is either advantageous or disadvantageous."[17] They concluded "that ability grouping is quite ineffective unless accompanied by proper changes in

---

[15]Alfred Yates, Grouping in Education (New York: Wiley and Sons, 1966).

[16]Robert T. Rock, "Critical Study of Current Practices in Ability Grouping," Educational Research Bulletin, IV (May-June, 1929), 67.

[17]W. Miller and M. J. Otto, "Analysis of Experimental Studies in Homogeneous Grouping," The Journal of Educational Research, XXI (February, 1930), 100.

method. Unless adaptation of methods and materials is a necessary correlation to ability grouping, one of the purposes of the project is defeated."[18] Turney's analysis of grouping studies found that:

> a) Most of the studies purporting to evaluate ability grouping have proved nothing regarding ability grouping but have only added evidence bearing upon the nature and extent of individual differences, b) most experimental attacks upon the value of ability grouping have failed to evaluate the chief claims for it, i.e., the possibility of adopting content, method, or time, and c) the true evaluation of ability grouping must be deferred until adequate experimental attacks have succeeded in measuring its alleged advantages.[19]

The failure to obtain conclusive results, the summaries couched in tentative terms, and the conflict in research findings caused Cornell to observe that "a review of the objective results of ability grouping leaves one convinced that we have not yet attained any unequivocal experimental results that are capable of wide generalization."[20] Reviewing published studies, he could

---

[18] Ibid.

[19] A. H. Turney, "The Status of Ability Grouping," Education Administration and Supervision, XVII (January-February, 1931), 126-127.

[20] E. L. Cornell, "Effects of Ability Grouping Determinable from Published Studies," The Grouping of Pupils, Thirty-fifth Yearbook of the National Society for the Study of Education, Part I (Bloomington, Illinois: Public School Publishing Co., 1936), p. 29.

only conclude:

> Experimental studies have in general been too piecemeal to afford a true evaluation of the results, but when attitudes, methods and curricula are well-adapted to further adjustment of the school to the child, results, both objective and subjective, may be favorable to grouping.[21]

Nearly thirty years later, Goodlad observed that "studies since the 1930's have not added precision to the conclusion or clarification of the problems analyzed by Cornell."[22]

More recent studies have done little to enlighten us. Millman and Johnson analyzed more than 8000 gain scores in English and mathematics for pupils in 327 class sections in twenty-eight schools. The study failed to show that the amount of gain depended on within-class variability, and concluded that "whatever the potentialities may be for increasing achievement through narrowing the ability range of classes, such improvement is apparently not taking place."[23] As Wyndham observed, "the

---

[21] Ibid., p. 302.

[22] J. I. Goodlad, "Classroom Organization," Encyclopedia of Educational Research, ed. by C. W. Harris (New York: MacMillan, 1960), p. 224.

[23] J. Millman and M. Johnson, "Relation of Section Variance to Achievement Gains in English and Mathematics in Grades 7 and 8," The American Education Research, 1964, p. 51.

first general impression one gains from these studies is that, granted their unequal experimental significance, they raise more issues than they settle."[24]

Some of these issues are sociological rather than academic in nature. In England, where most children in "public" schools and many in state-supported grammar schools are placed in "streams" (the English label for ability grouping), it has been suggested that such grouping is responsible for a self-proving hypothesis. The results of the vocationally important "11-plus" examinations given at the end of the fourth year of junior school may simply reflect the consequences of four years' streaming during which "A" classes get "A"-minded teachers and therefore "A" results, while "C" classes are taught by "C"-minded teachers whose expectations influence the academic achievement of their students. Daniels, after a thorough analysis of research from British and American sources concluded:

> a) Streaming lowers rather than raises the average level of attainment in junior schools,
> b) streaming slightly reduces the level of attainment of "bright" junior school children,
> c) streaming markedly retards the educational process of the "slower" junior children,

---

[24]H. S. Wyndham, Ability Grouping (Melbourne: Melbourne University Press, 1934), p. 107.

> d) streaming artificially increases the range of educational attainment of junior school children, and
> e) widens the gap between the "bright" and "backward."[25]

Douglas examined the practice of streaming from a socio-economic basis as well as academic, and concluded that:

> Children who come from well-kept homes and who are themselves cleaned, well-clothed and shod stand a greater chance of being put in the upper streams than their measured ability would seem to justify. Once there, they are likely to stay and improve their performance in succeeding years. This is in striking contrast to the deterioration noticed in those children of similar initial measured ability who are placed in lower streams. In this way the validity of the initial selection appears to be confirmed by the subsequent performance of the children and an element of rigidity is introduced early into the primary school system.[26]

The sociological questions raised in class-conscious England have had echoes in race-conscious America, most notably in the furor raised by the practice of "tracking" in the Washington, D.C. public schools. As a result, and despite nearly eighty years of practice and forty years of study, the issues concerning the effect of

---

[25] J. C. Daniels, "The Effects of Streaming in the Primary Schools," The British Journal of Psychology, XXXI (1961), 80.

[26] J. W. B. Douglas, The Home and the School: A Study of Ability and Attainment in the Primary Schools (London: MacGibbon and Kee, 1964), p. 118.

homogeneous grouping on academic achievement are largely unresolved and likely to remain so.

Laboratory Methods and Self-Paced Unit Plans. In 1888 Preston Search, superintendent of schools in Pueblo, Colorado, began a program designed to permit a child to pace his own coverage of course material rather than await his turn in daily recitation.[27] Search later used similar methods of organization in Los Angeles, but his ideas failed to be accepted and lay dormant for several years.[28]

In California, Frederick Burk and Mary Ward initiated a new movement toward individualized instruction in 1912-13. Burk's Individual System, as it was later called, provided prescribed courses of study for each student and made provisions for the testing of pupils as their units of work were completed. Class lectures and daily assignments were abandoned. In their place, a program of relatively independent study was substituted, with teachers assisting students in the location of necessary study material. Later, a series of self-instructional

---

[27]Preston Search, "The Pueblo Plan of Individual Teaching," Educational Review, VIII (June, 1894), 154-158.

[28]Guy M. Whipple, ed., Adapting the Schools to Individual Differences, Twenty-fourth Yearbook of the National Society for the Study of Education, Part II (Chicago: The University of Chicago Press, 1925), p. 59.

bulletins was published and distributed across the United States until a ruling by the California Attorney General stopped their publication in that State.[29]

Several methods or plans for individualizing instruction were reported in the Twenty-fourth Yearbook of the National Society for the Study of Education. One of the most prominent, Carleton Washborne's Winnetka Plan of Winnetka, Illinois, divided the curriculum into two parts. The first, dealing with essential common knowledge and skills, was studied in intensive units each morning. The second, stressing the self-expression of the child's own interests and abilities, involved the free and creative activities chosen by students each afternoon. While allowing for group or class work, emphasis was on individual study and progress.[30] Group promotion was replaced by individual achievement, with students taking self-administered tests to determine their readiness for the teacher tests.[31]

---

[29] Ibid., pp. 59-60.

[30] Carleton Washborn and Sidney Marland, Jr., Winnetka: The History and Significance of an Educational Experiment (Englewood Cliffs, New Jersey: Prentice-Hall, 1963).

[31] Whipple, op. cit., p. 82.

At about the same time, Parkhurst's Dalton Laboratory Plan[32] was developed in Dalton, Massachusetts, and like the Winnetka Plan, it owed much of its inspiration to Frederick Burk. Properly a sociological rather than a curricular plan, it attempted to modify the conditions within schools by a commitment to three principles: (1) freedom for the individual child to work on his assignments, (2) cooperation in group life, and (3) the budgeting of time in relation to the proportion of effort-to-attainment. A unique feature furnished students with a "contract" specifying the completion of a certain number of assigned units within a fixed period of time.[33] Other programs cited in the Twenty-fourth Yearbook include the Individualized Instruction Plan for Arithmetic in Detroit, Michigan, and the Individualization of Work in the Vocational School at Madison, Wisconsin, all marked by the attempt to center instruction more or less on the learner's interests while pacing it according to his abilities.[34]

---

[32]Helen Parkhurst, Education on the Dalton Plan (New York: Dutton, 1922).

[33]Whipple, op. cit., pp. 84-87.

[34]Ibid., pp. 101-114.

Mayer-Oakes,[35] adopted the Dalton Plan successfully and reported a gain of 25% in the proportion of students who passed the state-wide examinations, but Thompson,[36] evaluating results from a more rigorously controlled experiment, did not find any special advantage for the Dalton Plan. A modified Dalton Plan was successfully administered by Underhill.[37]

Billett[38] describes a third individualized method of instruction known as the Morrison Plan. The classroom is transformed into a laboratory in which sequenced lesson units and guide sheets for assignments are differentiated for pupils of varying ability. The teacher's role is to give personal guidance to the pupil's work and study activities. The Morrison Plan was most frequently associated with the teaching of science, and 9% of the secondary schools in this country were reported using this plan in 1932.

---

[35]G. H. Mayer-Oakes, "The Dalton Plan in a Small High School," The Education Journal, LVII (December, 1936), 244-248.

[36]W. H. Thompson, "Experiment with the Dalton Plan," The Journal of Educational Research, XXVI (March, 1933), 493-508.

[37]R. J. Underhill, "Experience of Scarsdale with Individual Instruction," New York State Education Journal, XVII (March, 1931), 677-678.

[38]Roy O. Billet, The Administration and Supervision of Homogeneous Grouping (Columbus, Ohio: Ohio State University Press, 1932).

Current Self-Paced Unit Plans. The development of teaching materials, referred to as "learning packages," have become an integral aspect of recent organizational programs which are, in part, indebted to the older Winnetka and Dalton Plans. Each package, whether teacher-initiated and prepared or developed commercially, is a self-contained set of materials designed to teach a single concept, idea, skill, or attitude. Specific objectives to be learned are listed for the student and stated in behaviorial terms. Various media, materials, and methods are used in the accomplishment of these objectives, and evaluation by pre-test, self-test, and post-test is included to allow the student to measure his own progress. Referring to UNIPAC, a set of teacher-prepared materials developed by the IDEA Materials Center and founded by the Charles F. Kettering Foundation, Bishop describes the format as follows:

> UNIPACs are designed to help students achieve at their own best learning rates. Given UNIPACs, students will be able to achieve measurable performances under given conditions, at or above specified minimum levels, and at rates which are individually unique to each student.
>
> When the student with the assistance of a teacher selects a particular UNIPAC in his sequential learning program, he takes a pre-test based on the behavioral objectives in that UNIPAC. If the pre-test results indicate that he is ready for the concepts or skills of the UNIPAC, he selects from suggested learning

materials and activities in the UNIPAC those which fit his own unique learning style. Behavioral objectives, which are contained in his UNIPAC, guide him as he learns. When he feels that he has achieved one behavioral objective, he proceeds to the next one and again selects from suggested learning materials and activities.

When the student feels that he has achieved all of the behavioral objectives in his UNIPAC, he takes a self-test. If the self-test results indicate that he is ready for teacher evaluation, the student can request the post-test for his UNIPAC. Upon successful completion of the post-test, the student may proceed to this next UNIPAC or he may participate in quest activities. If the student elects to participate in quest, he defines a problem for in-depth or in-breadth study, and he conducts his research in order to achieve some level of resolution of his problem.

During the entire learning sequence the teacher provides as many opportunities as possible for a student-teacher and student-student interaction during conferences and seminars. Small learning teams, made up of from two to six students are formed whenever feasible. The teacher monitors each student's progress, diagnoses learning problems, prescribes possible alternative learning materials and activities, and evaluates each student's progress in achieving the stated behavioral objectives.[39]

Perhaps the most significant example of the commercially-prepared materials is the Individually Prescribed Instruction (IPI) program administered by the Learning Research and Development Center of the University of Pittsburgh and Research for Better Schools, Inc. based in Philadelphia.

---

[39]Lloyd K. Bishop, Individualizing Educational Systems (New York: Harper and Row, 1971), pp. 36-37.

Scanlon and Bolvin define IPI as the ". . . planning and conducting with each student a program of his studies that is tailored to his learning needs and to his characteristics as a learner. IPI takes into account such parameters of individual differences as rate of learning, amount of practice and, to some extent, preference for mode of instruction."[40] They further describe the function of their project as an ". . . instructional system based on specific objectives, correlated with diagnostic tools, teaching materials and methods. It represents one specific way of providing for wide ranges of differences that exist in classrooms. Certainly it typifies what can be done to help resolve the age-old problem of providing for each student, each day, his own program of studies."[41]

The IPI program is primarily involved with the subject areas of reading, mathematics, spelling, science, and handwriting, and attempts to plan and implement a program adapted to the personal and learning needs for every student. Four main considerations are postulated:

1. The rate of speed at which each child progresses depends upon his own capacities. He

---

[40]Scanlon and Bolvin, op. cit., p. 2.

[41]Ibid., p. 1.

places himself upon the continuum by taking both placement tests and pre-tests.

2. The curricular material is arranged in a sequential order called continuum. The assignments are given by a prescription to fit his individual needs. (A prescription is an individual lesson plan for each student each day.)

3. The student's mastery of the curriculum is judged by curriculum-embedded tests and post-tests. He is required to perform at a level of 85%.

4. The child works independently in most cases, thus building up his sense of responsibility and also his confidence in his own knowledge. He begins to realize that learning is a process that is dependent on his own participation and initiative.[42]

The saluatory effect of individualized instruction on achievement is well-documented in research studies from many fields by Appleby,[43] Armstrong,[44] Postlethwaith and Novak,[45] McCarley,[46] and others. In a study of

---

[42] Ibid., p. 2.

[43] B. C. Appleby, "The Effects of Individualized Reading on Certain Aspects of Literature Study with High School Seniors" (unpublished Ph.D. dissertation, University of Iowa, 1967).

[44] W. H. Armstrong, "An Experimental Investigation of The Instructional Effectiveness of Published Programmed Instructional Materials vs. Individualized Instruction in Area Vocational-Technical Schools"(unpublished Ph.D. dissertation, The Florida State University, 1967).

[45] S. N. Postlethwaith and Joseph Novak, "The Use of 8mm Loop Films in Individualized Instruction," Annals of the New York Academy of Science (New York: The New York Academy of Science, March 31, 1967).

[46] W. W. McCarley, "An Experimental Study to Evaluate the Effectiveness of an Individualized Instructional Method and Lecture-Discussion Method of Teaching Vocational Agriculture Classes" (unpublished Ph.D. dissertation, Michigan State University, 1968).

mathematics under the IPI curriculum, Glaser observed twenty-one experimental classes in four schools, once before the introduction of the individualized program and four times after the program began. Control classes were similarly observed during the school year. Besides the superior achievement of students in the experimental groups, Glaser reported that:

> In the control class, three aspects of the communication pattern appeared as follows: 1) over half of the communications in the classroom were noninstructional, 2) about 90 percent of the communications were teacher-oriented; half of these were directed to the single student and half to groups of students, and 3) where the teacher talked to one student, it was most likely that the communication was noninstructional; when the teacher talked to more than one student, it was likely that the communication was instructional.
>
> Before the initiation of the individualized program, the communication pattern in the experimental classes was highly similar to this control-school pattern. After the introduction of the individually prescribed instruction procedure, the following appeared: 1) over three-quarters of the communications were instructional in nature, 2) 20 percent of the communications were teacher-initiated; of these, three-quarters were directed to the single student, 3) about 80 percent of the communications were student initiated; of these, three-quarters were instructional in nature, and 4) there was a trend for the overall number of communications to decrease in the experimental classes.[47]

---

[47] Robert Glaser, Adapting the Elementary School Curriculum to Individual Performance (Pittsburgh: Publication of the University of Pittsburgh Learning Research and Development Center, Reprint 26, 1967), pp. 3-4.

Programmed and Computerized Instruction. Programmed teaching by text or machine is "an attempt to obtain the kind of behavioral control shown possible in the laboratory."[48] The concept of dividing the segments of a course into "small, but rigorous steps, each of which is rewarding,"[49] has revolutionized some schools and had a profound influence on the role of the teacher. Programmed methods whether "linear" or "branched" can be adapted to the individual by alterations in the method and sequence of presenting those units, and by virtue of the fact that the student, working at his own pace, either corrects his response to each frame or has it corrected for him. Regardless of the technique, the central element of the system is the positive or negative reinforcement of responses, leading to the extinction of incorrect behavior.

The convergence of computer technology and programmed learning will have perhaps the greatest single impact on instruction in the future. Because of the inordinant amount and types of material which can be

---

[48]James G. Holland, "Teaching Machines: An Application of Principles from the Laboratory," Journal of the Experimental Analysis of Behavior, III, No. 4 (October, 1960), 275.

[49]B. F. Skinner, The Technology of Teaching (New York: Appleton Century Crofts, 1968), p. 3.

stored and immediately recalled for presentation, the high degree of control over the learner, and the ease of varying the sequence of presentation, computer-assisted instruction (CAI) provides unusual opportunities for creating individualized instructional programs.

To a great extent, CAI is an extension of the simpler programmed teaching machines. In that format, the student is presented with a series of statements and questions to which he must correctly respond by pushing one of a choice of keys. If his response is correct, the machine informs him of that fact and presents the next question. If he is incorrect, the machine announces the error, presents more information, and requires the student to try again. The computer's contributions to the system are described by Carter:

> At the System Development Corporation, we have built an experimental computer-based schoolroom called "CLASS" which stands for "Computer-Based Laboratory for Automated School System." CLASS is a rather unusual schoolroom in that each student works in a separate small cubicle which has equipment allowing him to receive visual and auditory instruction through film projectors, tape recorders, or television. The student is able to respond to the material being presented through a special switchboard, or set of buttons, which is connected to our Philco 2000, a medium-sized modern computer. The student's response is instantly transmitted to the computer which has in it a program for recording the response, for analyzing it, and for determining what instructional material should be presented next to the student. On the basis

> of this program, the computer transmits a signal back to the student which instructs him about the film frame or auditory grouping to which he should next attend. As the student progresses through the instructional material, the computer is able to specify the sequence of materials to meet his particular needs. That is to say, as the student responds to the instructional items, his progress is constantly monitored and wherever items are being missed or trouble appears, the computer analyzes the difficulty and presents to the student items of sequences of material which attempt to remedy it.[50]

Properly programmed, the computer's power lies in its ability to continually monitor and assess the student's progress, to evaluate and modify its instruction presentation relative to that progress, and to provide a detailed record of the student's achievement and manner of achievement. For example, the computer will:

1. Engage in two-way communication with a student by means of natural language messages.
2. Guide the student through a program of tasks, helping him where he has difficulty, and accelerating his progress where he finds little challenge.
3. Observe and record significant details of the student's behavior, including steps undertaken in performing tasks, time taken for particular steps, and values of varying psychological and environmental qualities.
4. Simulate the operation of a physical, mathematical, or social process responding to variations in parameters.

---

[50] Launor F. Carter, "Computers: Their Impact on Instruction, on Educational Planning, and on the Curriculum," cited in Lloyd K. Bishop, Individualizing Educational Systems (New York: Harper and Row, 1971), p. 48.

5. Analyze and summarize performance records and other behavioral records of individual students and also groups of students.[51]

There are significant limitations to CAI learning systems. The computer's ability to understand partial responses and meanings is limited, and it cannot devise on-the-spot solutions and alternatives. The most serious impediment to the extensive use of CAI is the currently prohibitive cost of the equipment. It is possible that the continuing development of time-sharing facilities will allow schools to have access to this tool, via terminals, without the expense of an "in-house" installation.

Individualizing Music Instruction

Programmed Instruction. The attempts of music educators to individualize instruction have been largely confined to the development of self-instructional programs and other devices designed to promote more efficient learning of specialized musical skills. In 1958-59, Spohn[52] assembled structured drill material for use in the

---

[51] E. N. Adams, "Computer-Assisted Instruction," Computers and Automation, II (March, 1966), 17-18.

[52] C. L. Spohn, "An Exploration in the Use of Recorded Teaching Material to Develop Aural Comprehension in College Music Classes" (unpublished Ph.D. dissertation, Ohio State University, 1959).

teaching of melodic perception at the college level. The results of his studies indicated that structured drill provided to students for use outside of normal class hours was significantly more effective than unstructured drill in the same conditions.

Carlsen[53] compared the effectiveness of linear and branched programs with teacher-instruction in melodic dictation. Both types of programmed learning were shown to be more beneficial to the college students than a comparable group taught by more conventional methods, but no superiority could be claimed for either the linear or the branching technique. Wardian[54] and Ashford[55] also found programmed materials to be a more efficient method of teaching the fundamentals of music theory to college

---

[53]James C. Carlsen, "An Investigation of Programmed Learning in Melodic Dictation by Means of a Teaching Machine Using a Branching Technique of Programming" (unpublished Ph.D. dissertation, Northwestern University, 1962).

[54]J. Wardian, "An Experiment Concerning the Effectiveness of Programmed Learning for Use in Teaching the Fundamental of Music" (unpublished Ph.D. dissertation, Washington State University, 1968).

[55]T. Ashford, "The Use of Programmed Instruction to Teach Fundamental Concepts in Music Theory," Journal of Research in Music Education, XIV (Fall 1966), 171-177.

students. Hargiss[56] developed a text, after numerous revisions, to teach the rudiments of music theory to elementary education majors in piano classes. While students who used the final revision for only one semester attained the same level of proficiency as a group who studied in a traditional class, a third group subjected to both teacher instruction and programmed material achieved more than either of the former groups.

Tape recorder models for use in instrumental instruction were first devised by La Bach.[57] His device, a two-track tape recorder with microphone, relay switches and controls, was designed to enable students to record their practice on a given exercise, hear it played back, and compare it with the playback of a pre-recorded model. Unfortunately, a statistical evaluation of student progress was not attempted, but La Bach concluded that students enjoyed using the device and that students "may well" have shown significant improvement in performance skills through its use.

---

[56]Genevieve Hargiss, "The Acquisition of Sight Singing Ability in Piano Classes for Students Preparing to be Elementary Teachers," Journal of Research in Music Education, X (Spring, 1962), 69-75.

[57]Parker La Bach, "A Device to Facilitate Learning of Basic Music Skill," Bulletin of the Council for Research in Music Education, No. 4 (Winter, 1965), 7-10.

In a study using similar tape-recorded models and instructions for practice, but without provision for recording and playback, a group of elementary school violin students who practiced with these materials were judged by a panel of expert violinists to have superior skill in phrasing, bowing, tempo, intonation, rhythm, expression and tonal quality than their counterparts who practiced normally. In a similar study, Puopolo[58] prepared practice tapes for use by beginning instrumentalists. Each tape generally consisted of a model performance or an exercise with simple piano accompaniment, and verbal instructions, explanations, and counting of meter before, during and after all model performances. According to Puopolo, the following format was adhered to:

> 1. A brief reminder of problems to be encountered preceded each tune or exercise to be practiced (new rhythms, new notes, fingerings, chromatics, new note values, phrasings, etc.).
> 2. Student listened to model performances of tune or exercise while reading along from the score.
> 3. While reading from the score, student listened to first isolated segment.
> 4. Student played segment very slowly, then slightly faster, faster, and finally "a tempo."

---

[58]Vito Puopolo, "The Development and Experimental Application of Self-Instructional Practice Materials for Beginning Instrumentalists" (unpublished Ph.D. dissertation, Michigan State University, 1970).

(Directed by recorded counting and piano accompaniment.)

5. Student was asked if he remembered to cope with specific problems, for example, "Did you remember to use the second valve for that F# on the third beat?"

6. Student listened to reinforcement and compared.

7. After each segment was drilled, student performed entire tune or exercise, then listened to reinforcement. (According to instructions, student either listened to reinforcement or played in unison with it.)[59]

Practice material, the weekly band assignment, was the same for both experimental and control groups. Students in the former group were issued cassette players and the appropriate tape, and were assigned individual daily practice sessions by the music teacher. Control group members were also required to practice daily, but without the use of the tapes. After a period of ten weeks, the students were tested on the Watkins-Farnum Performance Scale[60] and students using the self-instructional practice tapes were found to have achieved significantly superior results.

These and other studies involving various aspects of performance and using such nonprogrammed technical

---

[59] Ibid., pp. 37-38.

[60] John Watkins and Stephen Farnum, The Watkins-Farnum Performance Scale (Winona, Minnesota: Hal Leonard Music, Inc., 1965).

devices as the tachistoscope,[61] instructional films,[62] and oscilloscopic transparencies[63] have shown that effective, although somewhat cumbersome and expensive methods exist for the improvement of music instruction. Summarizing his review of research, Duerkson states that:

> Results of studies of programmed instruction and the use of various instructional devices have at least two important implications for the music teacher: (a) there are some instructional programs and devices that supplement traditional methods of class or private instruction; (b) there are other instructional programs and devices that are equal in effect to traditional classroom or private instruction. Use of these programs and devices can free instructional time for other pursuits in which the teacher is essential. In both cases, the proper use of instructional technology seems to lead to more effective instruction in instrumental music.[64]

---

[61] R. F. Difranzo, "A Comparison of Tachistoscopic and Conventional Methods in Teaching Grade Three Music Sight-Playing on a Melody Wired Instrument" (unpublished Ph.D. dissertation, University of Connecticut, 1966).

[62] D. M. Beley, "The Development and Evaluation of the Effectiveness of a Pilot Instructional Sound-film for Teaching Beginning Trumpet Students with a Brief Survey of the History of Trumpet Instruction and the History of Educational Film Research" (unpublished Ph.D. dissertation, University of Iowa, 1970).

[63] T. S. Small, "The Evaluation of Clarinet Tone Through the Use of Oscilloscopic Transparencies," Journal of Research in Music Education, XV (Spring, 1967), 11-22.

[64] George Duerkson, Teaching Instrumental Music (Washington, D.C.: MENC, 1972), p. 6.

Private vs. Class Instruction. Patterns of instrumental class organization have rarely been questioned by music educators, and the few systematic investigations have mainly dealt with the relative effectiveness of private or class lessons. Waa[65] compared the effect of both methods of instruction on the musical achievement and musical aptitude of fifth and sixth grade instrumental beginners. He found that private students attained significantly higher scores than class students on the Watkins-Farnum Performance Scale, but admitted that because the private students' scores appeared to be seriously influenced by an uncontrolled band-no band variable, this difference could have been due to the combination of band experience and private lessons. Unfortunately his groups were quite small, some as small as N=4, and his evaluation of data required the use of non-parametric statistics (Kruskal-Wallis one-way analysis of variance and the Mann-Whitney U Test) which precluded the statistical confirmation of that interaction.

---

[65]Loren Waa, "An Experimental Study of Class and Private Methods of Instruction in Instrumental Music" (unpublished Ph.D. dissertation, University of Illinois, 1965).

Shugert,[66] in an attempt to more rigorously control the confounding variables which had plagued Waa's study, evaluated the effects of class (homogeneous and heterogeneous) and private lessons on musical achievement (Watkins-Farnum Performance Scale and the Farnum Music Notation Test), musical aptitude (Seashore Tests of Musical Talent) and attitude towards school music (Remmers School Subject Rating Scale). He found:

> 1. no significant differences between class and private students on the tests of aptitude and notation,
> 2. that private students were significantly superior to class students in performance achievement,
> 3. no significant differences in performance achievement between homogeneous and heterogeneous classes.[67]

Shugert used t-tests exclusively in evaluating his data and could therefore make no comment on the role of aptitude on achievement nor the interaction of lessons and achievement. More seriously, he experienced a massive mortality rate in the thirteen weeks of the study: only 123 students of the original 219 completed the experimental period. One might both justifiably assume that the

---

[66] James Shugert, "An Experimental Investigation of Heterogeneous Class and Private Methods of Instruction with Beginning Instrumental Music Students" (unpublished Ph.D. dissertation, University of Illinois, 1969).

[67] Ibid.

drop-outs represented the least successful students in the sample, and speculate about the possible effects on performance achievement had they finished the experiment and their scores been included.

In a review of Shugert's study, Noble[68] questioned the use of the Watkins-Farnum Performance Scale to measure performance achievement, pointing out that the test does not measure such ensemble skills as balance, precision, and vertical intonation. Unfortunately no studies are available which delineate the extent, if any, to which class instruction influences those variables. However, it is apparent that Shugert intended only to measure the effect of instructional conditions on individual achievement, and that Noble's charge of a biased measuring instrument is imprecise: there is no evidence that the Watkins-Farnum Performance Scale fails to objectively evaluate performance achievement, and studies cited by

---

[68]Robert Noble, "Critique: An Experimental Investigation of Heterogeneous Class and Private Methods of Instruction with Beginning Instrumental Music Students," Bulletin of the Council for Research in Music Education, No. 21 (Summer, 1970), 47-51.

Watkins,[69] Farnum[70] and Mitchum[71] indicate that the scale indeed measures what it purports to measure. Noble's statement should be considered a value judgment on Shugert's decision not to include a measure designed to evaluate the relative effect of the teaching methods on ensemble performance. Shugert's decision was clearly a practical one; the complexities involved in the construction and validation of an objective scale for measuring ensemble performance is staggering, and would itself encompass the scope of an important thesis. Subjective analyses by a panel of judges would be limited by its very subjectivity and/or its inability to produce quantifiable data.

Individualized Music Instruction. In a project to individualize instruction within classes of beginning instrumentalists by means of scores on an aptitude test,

---

[69]John Watkins, Objective Measure of Instrumental Performance (New York: Teacher's College Bureau of Publications, 1942).

[70]Stephen Farnum, "Prediction of Success in Instrumental Music" (unpublished Ph.D. dissertation, Harvard University, 1950).

[71]John Mitchum, "The Wing 'Standardized Tests of Musical Intelligence'; An Investigation of Predictability with Selected Seventh Grade Beginning Band Students" (unpublished Ph.D. dissertation, Florida State University, 1969).

Froseth[72] constructed texts designed for use in like-instrument (homogeneous) classes with provisions for the simultaneous performance of material written at various levels of difficulty. The texts used by the experimental groups allow students of high, average, and low levels of achievement to perform lesson material simultaneously and without the frustration caused by a pace of drill too slow or quick for their capabilities. According to Froseth,

> In order to provide more musical instruction, traditional non-musical exercises were excluded in favor of folk-song literature and musical sounds. Teachers were instructed to avoid lock-step instruction and to use the flexibility of the experimental texts to elicit musical responses for the purpose of developing musical independence.[73]

Froseth also constructed supplementary texts and exercises of folk-song literature so that the singing voice could be used to reinforce concepts of tonality, musical phrasing, and musical styles of articulation. Eurhythmic activities and the use of percussion instruments were used to develop rhythmic aptitudes.

---

[72]James O. Froseth, "Using MAP Scores in the Instruction of Beginning Students in Instrumental Music," Journal of Research in Music Education, XIV (Spring, 1971), 98-101.

[73]Ibid., p. 99.

Describing instructional procedures, Froseth states that:

> The provision for self-initiated and self-directed study was an important innovation employed in experimental group classes. In order to facilitate varying interests and needs, students in the experimental group were encouraged to "play by ear," improvise and choose songs to practice and play from a supplementary book of folk songs. Specific assignments were avoided in order to allow students to determine their own goals and pursue their interests freely and independently. In addition, many lesson projects made provision for independent and self-directed study. Self-direction was facilitated by sequencing study material in a manner that allowed students to correct their own errors, and, therefore, learn independently.[74]

Thirty-four sixth-grade students were given the Musical Aptitude Profile (MAP), subsequently grouped into high, average and low categories according to their MAP composite scores and then randomly placed into either the experimental or control group. No other basis was used to establish the equivalency of the groups.

One of the dependent variables, performance achievement, was tested by means of students' recorded performances on self-prepared and sight-read etudes constructed by the author and rated by two judges. The results demonstrated the superiority of the individualized

---

[74] Ibid.

instruction and the relationship of MAP scores to achievement. No significant interaction was found to exist between instruction and aptitude.

Subject Variables and Music Achievement

Music educators are continually intrigued by the relationship of certain subject variables to performance achievement. A variety of tests measuring intelligence, aptitude, academic achievement, personality, etc. are available, and are inevitably used to correlate students' scores on those variables with some aspect of musical success. Knowledge of these relationships are, unfortunately, sometimes used to encourage or discourage an individual planning to participate in an instrumental music program.

Such attempts to use these criteria in selecting students are unfortunate because, philosophical considerations aside, research inevitably informs us that the prediction of success or failure cannot be accurately made for individuals. As Duerkson summarizes:

> Studies at different levels ranging from kindergarten to college lead to a single conclusion: scores on presently available standardized tests, used alone or in combination, do not correlate well with success or failure in instrumental music and cannot be used as the only predictor of whether or not an individual will succeed. Success in instrumental music has been uncovered in several ways in these studies, but

> however measured, correlations with standardized test scores seldom reach 0.50. While this degree of correlation is of value in research and in making predictions for groups, it is not high enough to warrant confidence in predictions for individuals. High scores on the various tests do not assure that the student will succeed, nor do low scores assure that he will not. The data suggest that it is not justifiable to bar students from instrumental music programs solely on the basis of their scores on the aptitude type of test.[75]

In a study investigating the power of musical aptitude, general intelligence, and academic achievement to predict drop-outs, Young[76] found he was unable to predict a student's successful completion of the instrumental program. Mitchum,[77] using a deletion or addition regression program, found that measures of I.Q. and academic achievement showed the most potential for prediction of scores on the Watkins-Farnum, r = .49 and .50 respectively, and Corno[78] obtained similar results.

---

[75] Duerkson, op. cit., p. 6.

[76] William Young, "An Investigation of the Relative and Combined Power of Musical Aptitude, General Intelligence, and Academic Achievement Tests to Predict Musical Attainment" (unpublished Ph.D. dissertation, University of Iowa, 1969).

[77] Mitchum, op. cit.

[78] Guy Corno, "Relationship Between the Degree of Intelligence and Performance on a Test of Musical Aptitude" (unpublished Master's Thesis, Dusquesne University, 1958).

Likewise Rhoades[79] found a measure of intelligence to be a more superior predictor of musical success than a test of musical talent.

Gordon,[80] however, compared performance achievement with other variables and found correlation coefficients of .91 for MAP, .62 for I.Q., and .60 for academic achievement. Because administrative testing practices allowed him to use only a small number of subjects, however, he cautioned against the generalization of his results. Schneider and Cady reviewed all research in music education between 1930 and 1962, and concluded:

> 1. Intelligence appears to be the most important single variable in predicting success in instrumental music.
> 2. Musicality (as measured by musical aptitude tests), by itself, does not appear to be a satisfactory predictor of achievement in music.
> 3. A definite relationship seems to exist between academic average, music grade average, musical aptitude, intelligence, and musical achievement.[81]

---

[79]Fordyce Rhoades, "An Evaluation of Measures for the Prediction of Success in Instrumental Study" (unpublished Master's Thesis, University of Washington, 1938).

[80]Edwin Gordon, "A Study of the Efficacy of General Intelligence and Musical Aptitude Tests in Predicting Achievement in Music," Bulletin of the Council for Research in Music Education, No. 13 (Spring, 1968), 40-45.

[81]Erwin Schneider and Henry Cady, "Evaluation and Synthesis of Research Studies Relating to Music Education: 1930-1962," Bulletin of the Council for Research in Music Education, No. 9 (Spring, 1967), 8-9.

In addition to the variable mentioned by Schneider and Cady, other experimenters have attempted to relate personality factors to achievement in instrumental music. Cooley,[82] in a study plagued by faults of design and uncontrolled variables, found very little relationship between intelligence, personality, and various tests of musical abilities. In 1957, Cramer[83] attempted to predict achievement of fourth through eighth grade students on the Watkins-Farnum Scales using measures of I.Q., personality, physical growth, and the Seashore tests of Pitch, Rhythm, and Tonal Memory. Although no test could reliably predict success, he found that high performance achievement was accompanied by high scores on the variables listed. Dealing solely with aspects of personality, Kaplan[84] found that instrumental music students

---

[82]John Cooley, "A Study of the Relation Between Certain Mental and Personality Traits and Ratings of Musical Abilities" (unpublished Ed.D. dissertation, University of Michigan, 1952).

[83]William Cramer, "The Relation of Maturation and Other Factors to Achievement in Beginning Instrumental Performance at the 4th through 8th Grade Levels" (unpublished Ph.D. dissertation, Florida State University, 1958).

[84]Lionel Kaplan, "The Relationship Between Certain Personality Characteristics and Achievement in Instrumental Music" (unpublished Ph.D. dissertation, New York University, 1961).

in general and high achievers in particular were characterized as more self-confident, self-controlling, and intellectualizing than non-music subjects and low achievers. Using a test of cognitive musical achievement, however, both Thayer[85] and Schleuter[86] could find no systematic relationship between achievement and personality traits.

Summary

In summary, it can be said that the evidence of research shows that some individualized instrumental techniques can be an effective way of coping with and providing for the differences students bring to class. It can also be fairly stated that until recently, many music educators have been reluctant to concern themselves with characteristics of the individual learner and the adoption of teaching methods suitable to him, preferring instead to seek yet new tests which might screen out a potential

---

[85]Robert Thayer, "An Investigation of the Interrelation of Personality Traits, Musical Achievement, and Different Measures of Musical Aptitude" (unpublished Ph.D. dissertation, University of Iowa, 1971).

[86]Stanley Schleuter, "An Investigation of the Interrelation of Personality Traits, Musical Aptitude and Musical Achievement" (unpublished Ph.D. dissertation, University of Iowa, 1971).

non-contributor to the band program. Despite that bias apparent in most studies in music reviewed here, the literature levels lead us to expect that "lock-step" conditions of instruction will yield fairly substantial relationships between performance achievement and the variables of I.Q., academic achievement, and musical aptitude. Low-to-moderate relationships would be expected between performance achievement and personality measures. Because of the paucity of relevant research on attitude towards music and individualized instruction relating to achievement, it is impossible to suggest with any certainty their potential role in this study.

CHAPTER III

DESIGN OF THE STUDY

Procedures

Sample. Two Lansing, Michigan schools, Pattengill Junior High School and Dwight Rich Junior High School, participated in the project during the 1970-71 academic year. Because of the Lansing Public Schools' policy of discouraging doctoral research in their city's schools, permission to carry out the study could only be obtained by assuring the superintendent that the author would be the instructor for the experimental group (Pattengill Junior High School) in which drastic changes of instruction would be made.

Thus only the control group (Rich Junior High School) was chosen by random means. However, the city of Lansing employs an extensive system of bussing to achieve a racial, social and economic balance of students within its schools. Not unexpectedly, therefore, the two groups displayed remarkable similarity relative to the subject

variables. While it must be admitted that the selection procedures will limit the generalizability of the results, there is no firm evidence that either group arises from differing populations.

Subjects. The sample was comprised of the seventh grade students enrolled in the beginning instrumental program from both schools; the data for all students with prior instrumental music instruction (two students at Pattengill Junior High School, one student at Rich Junior High School) were excluded. No special process beyond the students' desire to participate was invoked to select participants for the program, and no criteria other than the students' preference played a role in the selection of their musical instruments.

Table 3:1 contains the N for sex, the N of each group, and the total N for the study.

Table 3:1. N for Groups, Sex, and Totals.

School	Male	Female	Totals
Pattengill JHS	26	19	45
Rich JHS	25	20	45
Totals	51	39	90

The mortality rate was extremely low, consisting of one student at Pattengill Junior High School and two students at Rich Junior High School, or a rate of 3.33 percent for the whole sample.

Method

Both groups were sub-divided into three classes of approximately fifteen students per class. Instruction was provided by two certified public school music teachers, and consisted of one fifty-minute, mixed-instrument class lesson every school day for a complete school year of 180 days. The instructional texts for all students were the First Division Band Method series, Part I and Part II.[1]

Control Treatment. Students in the control group were taught by what may be described as the ensemble method. In these classes, the students are seated in a semi-circle and in groups of similar instruments. Rehearsal procedure typically consists of the instructor's analysis and explanation of the content and novelties in a particular line of music, followed by extensive ensemble drill on that line. During or between repetitions,

---

[1]Fred Weber, First Division Band Method (Rockville Center, Long Island: Belwin, 1962).

further critical comment or demonstration by singing is made by the instructor, and the class may repeat the drill or progress to the next line, depending upon the instructor's evaluation of class competency. The decision to progress to a new line is made only by the instructor, and is usually based on his opinion that a sufficient number of students have attained a "reasonable" level of competency. This judgment may also be influenced by such extra-musical factors as the group's willingness to continue the drill or the need to "cover" certain material within a given class hour.

This lock-step procedure seemingly tends to maximize the teacher's ability to control both the direction and rate of class learning. While the specific concepts and skills presented for learning to the students are primarily governed by the design of the method book, the teacher may employ various means to emphasize those areas which he considers most important for the acquisition of performance ability.

Although the instructor may drill a small section of similar instruments, individual rehearsal is confined to an occasional solo performance, or the placing of a student in an area outside the main rehearsal room. With

the exception of the last procedure, which is usually used only with poor students who are far behind the class, the individual student has virtually no voice in the decision to continue or terminate drill.

Experimental Treatment. After the first week of the term, in which instruction concerning the assembly and maintenance of the instrument was given, students in the experimental group were not seated in a pattern, but instead were assigned to chairs widely dispersed about the classroom. At the start of the daily period, the students would begin individual practice at the point in their instruction book reached the previous class period. Of course, this point for one student was rarely identical to the material being practiced by any other student.

Instruction given by the teacher was exclusively tutorial and provided in only two instances. The first was at the student's request and could occur at any time an individual sought instruction. The second instance occurred when a student, deciding that he was capable of satisfactorily playing the complete assigned page he had been practicing, requested the teacher to evaluate his efforts on that material. What followed could best be described as a "mini-lesson": the instructor would set

tempi, listen to the student's recital, comment on the strengths and weaknesses of the performance, and make suggestions leading to the improvement of such factors as tonal and rhythmical accuracy.

During the initial stages the instructor assumed the responsibility of deciding whether the student had demonstrated sufficient competency to progress to new material on the next page. Later, and at a rate which varied from student to student, the decision to proceed gradually became a matter of discussion between student and instructor, and eventually became the sole prerogative of the student.

If the decision, however determined, was to begin a new page, the teacher explained any novel material, heard the student attempt to play it, and corrected errors of a cognitive nature such as failing to observe key signature. To prevent a single student from monopolizing the instructor's time and to promote accurate self-evaluation, the students were limited to one unit (page) evaluative conference per class period. This limit did not apply to requests for explanatory assistance.

Description of Instruments and Method of Gathering Data

At various times during the experimental period, data were gathered for all students on the subject variables of

1. Sex
2. Intelligence (I.Q.)
3. Grade Point Average (G.P.A.)
4. Attitude Towards Music
5. Musical Aptitude
6. Personal Adjustment

and on the dependent variable, performance achievement.

Information concerning Sex of the students was obtained by observation or, where necessary, by inspection of the school records.

The measure of I.Q. was the Otis-Lennon Mental Ability Test, Intermediate Level, by Arthur S. Otis and Roger T. Lennon and was administered by school psychologists to all seventh grade students in the Lansing Public Schools during the third week of the experimental period. According to the authors, the eight various types of verbal and non-verbal items which make up the test emphasize skills of abstract reasoning ability. One score

summarizes all eighty items. The Manual for Administration[2] gives a split-half reliability coefficient of .95. No data pertaining to validity is presented, but the results of then-current (1967) studies are scheduled to appear in the forthcoming Technical Handbook.

Grade Point Averages were obtained from school records and were computed exclusive of the year during which the students participated in the study. They therefore did not include grades received for the instrumental music classes in which they were enrolled for the duration of this study. The grades themselves reflect teachers' assessments of student academic achievement, and are based on a four-point scale, e.g., below 1.0 = failure, 4.0 = excellence.

The Attitude Towards Music test was constructed by Carter[3] using the Thurstone and Chave[4] "method of equal-appearing intervals." The scaling was performed by

---

[2]Arthur S. Otis and Roger T. Lennon, Otis-Lennon Mental Ability Test, Intermediate Level (New York: Harcourt, Brace and World, Inc., 1967).

[3]Warrick Carter, "Ethnic Music as a Source for the Musical Development and Enrichment of Culturally Different Students in General Music Classes" (unpublished Ph.D. dissertation, Michigan State University, 1970).

[4]Louis Thurstone and E. J. Chave, The Measurement of Attitudes (Chicago: University of Chicago Press, 1929).

ten music specialists who were asked to judge, on an eleven-point continuum, the degree of favorableness or unfavorableness of the attitude towards music expressed by each statement. The composite results were used to obtain the scale value of each attitude statement, calculated by Edwards'[5] "calculation of scale" formula. The test was given to all subjects during the first week of classes at the beginning of the school term. The administration was performed by a school counselor unknown to the students and during the planned absence of the classroom instructors involved in this study.

All students were given the Musical Aptitude Profile[6] battery of tests during the second week of the initial school term. The MAP is divided into three main sections: Tonal Imagery, Rhythm Imagery, and Musical Sensitivity. These sections are further subdivided into subtests. They are: Melody and Harmony for the Tonal Imagery division; Tempo and Meter for the Rhythm Imagery division; and Phrasing, Balance, and Style for the Musical

---

[5]Allen Edwards, Techniques of Attitude Scale Construction (New York: Appleton-Century-Crofts, Inc., 1957).

[6]E. Gordon, Musical Aptitude Profile Manual (Boston: Houghton Mifflin Co., 1965).

Sensitivity division. The tests of Tonal and Rhythm Imagery are described as "nonpreference" tests because there is an unequivocally correct or best answer for each item contained therein. The subtests of the third division, described as a preference test, are intended as measures of musical taste and were constructed to conform with the consensus of both music students and professionals.

Although it is possible to obtain eleven separate scores from the battery of tests, only the single composite score was used in this study. The standard score scale is based on a mean of fifty, and a standard deviation of ten, although special norms are provided for various grades and categories of students. The author lists various reliability coefficients for each test by grade, generally in the .90's for the total battery.

The measure of personality was the California Test of Personality.[7] Although the complete test includes two sections, Personal Adjustment and Social Adjustment, only the composite score for the test of Personal Adjustment,

---

[7]L. Thorpe, W. Clark, and E. Tiegs, California Test of Personality, 1953 Revision (Monterey, California: CTB/McGraw-Hill Book Co., 1953).

administered to all subjects during the first week of the experimental period, was used in this study. The items in the Personal Adjustment section measure six components of personal security: Self-Reliance, Sense of Personal Worth, Sense of Personal Freedom, Feeling of Belonging, Withdrawing Tendencies, and Nervous Symptoms. The test is designed to enable teachers and school officials to identify the types of maladjustment from which a student may be suffering, and thus is primarily a diagnostic test. The authors quote a reliability coefficient (Kuder-Richardson) of .83 and a standard error measurement of 2.87 for the Personal Adjustment section. No validity coefficient is given; instead, the Manual cites the results of various studies relating the test to clinical findings and other tests.

The dependent variable, performance achievement, was measured by the Watkins-Farnum Performance Scale.[8] During the final week of the term, all students were required to sight-read Form A of the Performance Scale, administered in a room equipped with a tape recorder, metrenome, chair, and music stand containing the test

---

[8]John Watkins and Stephen Farnum, The Watkins-Farnum Performance Scale (Winona, Minnesota: Hal Leonard Music, Inc., 1954).

items. Testing procedure was as follows:

1. Student reported individually to the testing room.
2. Instructor read the directions aloud to the student, and recorded his name.
3. Instructor activated the metrenome at the tempo specified by the test sheet, turned on the tape recorder and left the room.
4. Instructor waited near the closed door until the student's performance of all items at a given metrenome marking was completed. He then entered the room, shut off the metrenome and tape recorder, and repeated step three for the next set of items.

These recorded performances were scored by two judges, both senior lecturers in music at a College of Education in London, England. The judges had no knowledge of which students belonged to the experimental or control group, and thus could maintain complete impartiality.

To prevent instruction from being influenced by the teacher's knowledge of students' scores on the various tests, all data concerning the subject variables were either a) gathered at the end of the experimental

period or b) gathered at the initial stages of instruction but not scored until after the experimental period was completed.

Method of Analysis

At the conclusion of the experimental period, data for all students were collated. The means and standard deviations of both the experimental and control groups were computed for the subject variables of I.Q., G.P.A., Attitude Towards Music, Musical Aptitude, and Personal Adjustment.

To establish the similarity between groups on the subject variables and the role of sex within groups, separate analyses of variance were computed to determine if a significant difference existed:

1. between the experimental and control groups on the subject variables of I.Q., G.P.A., attitude towards music, musical aptitude, and personal adjustment,
2. between males and females of each group on the subject variables,
3. for the interaction between groups and sex on all subject variables.

In addition, correlation matrices showing the relationships between the subject variables were computed for all combinations of sex and groups.

The scores for the dependent variable, performance achievement, were analyzed with reference to the students' scores on the subject variables, i.e., as though they arose from a treatments-by-levels design. In other words, the performance achievement scores for both groups were assigned to trichotomized (low, medium, and high) categories and subjected to separate analyses of variance in order to determine the significance of:

1. the main effect of the treatments or instructional conditions on performance achievement,
2. the effects of each subject variable on performance achievement, and
3. the interaction between treatments and levels.

To investigate the effect of the students' sex on the dependent variable, the scores of both groups were dichotomized by sex. The resultant data of this 2 x 2 design were subjected to analysis of variance to yield F-ratios for:

1. the main effect of treatments,

2. the effects of sex on the dependent variable,
3. the interaction between treatments and sex.

The object of the analyses described above was to investigate the following null hypotheses:

1. There is no significant difference in performance achievement between the experimental and control groups.
2. There is no significant difference between males and females within the experimental and control groups, respectively, in performance achievement.
3. There is no significant difference in performance achievement between students of low, medium, and high I.Q.
4. There is no significant difference in performance achievement between students of low, medium, and high grade point average.
5. There is no significant difference in performance achievement between students of low, medium, and high attitude towards music.
6. There is no significant difference in performance achievement between students of low, medium, and high musical aptitude.

7. There is no significant difference in performance achievement between students of low, medium, and high personal adjustment.
8. There is no significant interaction effect on performance achievement between instructional treatment and sex.
9. There is no significant interaction effect on performance achievement between instructional treatment and I.Q.
10. There is no significant interaction effect on performance achievement between instructional treatment and G.P.A.
11. There is no significant interaction effect on performance achievement between instructional treatment and attitude towards music.
12. There is no significant interaction effect on performance achievement between instructional treatment and musical aptitude.
13. There is no significant interaction effect on performance achievement between instructional treatment and personal adjustment.

CHAPTER IV

ANALYSIS OF THE DATA

Analysis of Subject Variable Data

The means and standard deviations of both the experimental (Pattengill Junior High School: N = 45) and control (Rich Junior High School: N = 45) groups for the subject variables of I.Q., G.P.A., Attitude (Attitude Towards Music), MAP (Musical Aptitude Profile) and Personal Adjustment are listed in Table 4:1.

Analyses of variance failed to locate a significant difference between the experimental and control groups for any pair of the above means (see Appendix A for ANOVA Tables). While this does not preclude the possibility of a true difference, it is apparent through inspection of the means that, although no attempt was made to match the samples, the groups are in fact quite evenly balanced and that the difference between the experimental and control group in terms of subject variable means is non-significant.

Table 4:1. Means and Standard Deviations of Subject Variables for the Experimental and Control Groups.

Subject Variables	Means		Standard Deviations	
	Experimental	Control	Experimental	Control
I.Q.	34.80	36.29	18.63	14.54
G.P.A.	2.38	2.43	.76	.81
Attitude	17.02	16.15	2.25	3.01
MAP	50.32	51.78	8.76	7.69
Personal Adjustment	55.38	56.38	15.93	12.89

Tables 4:2 and 4:3 contain the correlation coefficients (Pearson's product-moment) between all subject variables except sex.

Table 4:2. Correlations of Subject Variables: Experimental Group.

	I.Q.	GPA	Attitude	MAP	Personal Adjustment
I.Q.	--				
GPA	.815	--			
Attitude	.337	.426	--		
MAP	.472	.400	.324	--	
Personal Adjustment	.230	.210	.312	.217	--

Table 4:3. Correlations of Subject Variables: Control Group.

	I.Q.	GPA	Attitude	MAP	Personal Adjustment
I.Q.	--				
GPA	.785	--			
Attitude	.395	.494	--		
MAP	.431	.391	.359	--	
Personal Adjustment	.261	.267	.367	.266	--

A comparison of the correlation matrices above reveals that the experimental and control groups are probably as well-matched on the subject variables as the means shown in Table 4:1 would indicate.

Analysis of Subject Variables: Sex Differences

Because of the large number of tables obtained by organizing each subject variable according to sex, and the possible combinations of sex and school, the means, standard deviations and analyses of variance for these data will be found in Appendix A, Tables A:1 to A:10. These tables show that sex differences do not seem to play a meaningful role in determining scores on the means of the subject variables. For example, the mean I.Q. for males in the experimental group is nearly identical to:

1. the mean I.Q. score for females in the experimental group,
2. the mean I.Q. score for males in the control group, and
3. the mean I.Q. score for females in the control group.

Analysis of variance revealed no significant differences between any pair of subject variable means, dichotomized by sex, within the experimental or control group.

While the disclaimer concerning the danger of attributing significance to the failure in finding significance bears repeating, it may be stated with reasonable assurity that the experimental and control groups, while not equivalent, are quite evenly matched relative to the subject variables. In the absence of quantitative evidence to the contrary, inferences about the effect of treatment on the dependent variable can be made with the fair supposition that the subject variables, by themselves, do not play dissimilar roles in the experimental and control groups.

Analysis of Data Relative to Performance Achievement and Subject Variables

Table 4:4 shows the performance achievement means and standard deviations for the experimental and control groups. Table 4:5 shows the correlations between performance achievement and the subject variables for both groups.

Table 4:4. Performance Achievement Means and Standard Deviations for Experimental and Control Groups.

	Experimental (Pattengill JHS)	Control (Rich JHS)
Means	23.22	17.11
Standard Deviation	13.68	11.23

Table 4:5. Correlations between Performance Achievement and Subject Variables.

Variable	Experimental	Control
I.Q.	.673	.700
GPA	.766	.634
Attitude Towards Music	-.054	.669
MAP	.471	.582
Personal Adjustment	.076	.623

The students in the experimental group showed a superiority on the dependent variable, performance achievement, of 6.11 points. In addition, the relationship of the dependent variable to certain criteria variables, particularly to the tests of attitude towards

music and personal adjustment, varied markedly between the groups. The performance achievement scores of both groups were analyzed, as stated in Chapter III, with reference to the students' scores on each subject variable, i.e., as though they arose from a treatments-by-level design. The effects of particular interest tested for significance were:

1. the main effects of Treatments,
2. the effect of each subject variable levels, on the dependent variable, and
3. the interactions between Treatments and Levels.

I.Q. and Performance Achievement. Figure 4:1 illustrates the performance achievement scores of the experimental and control groups, each trichotomized as to low, medium, and high I.Q. Figure 4:1 clearly shows:

1. That students in the experimental group were superior on the dependent variable to their counterparts in the control group.
2. That in both groups, students of higher I.Q. were superior on the dependent measure than students of lower I.Q.
3. The interaction between Treatments and Levels.

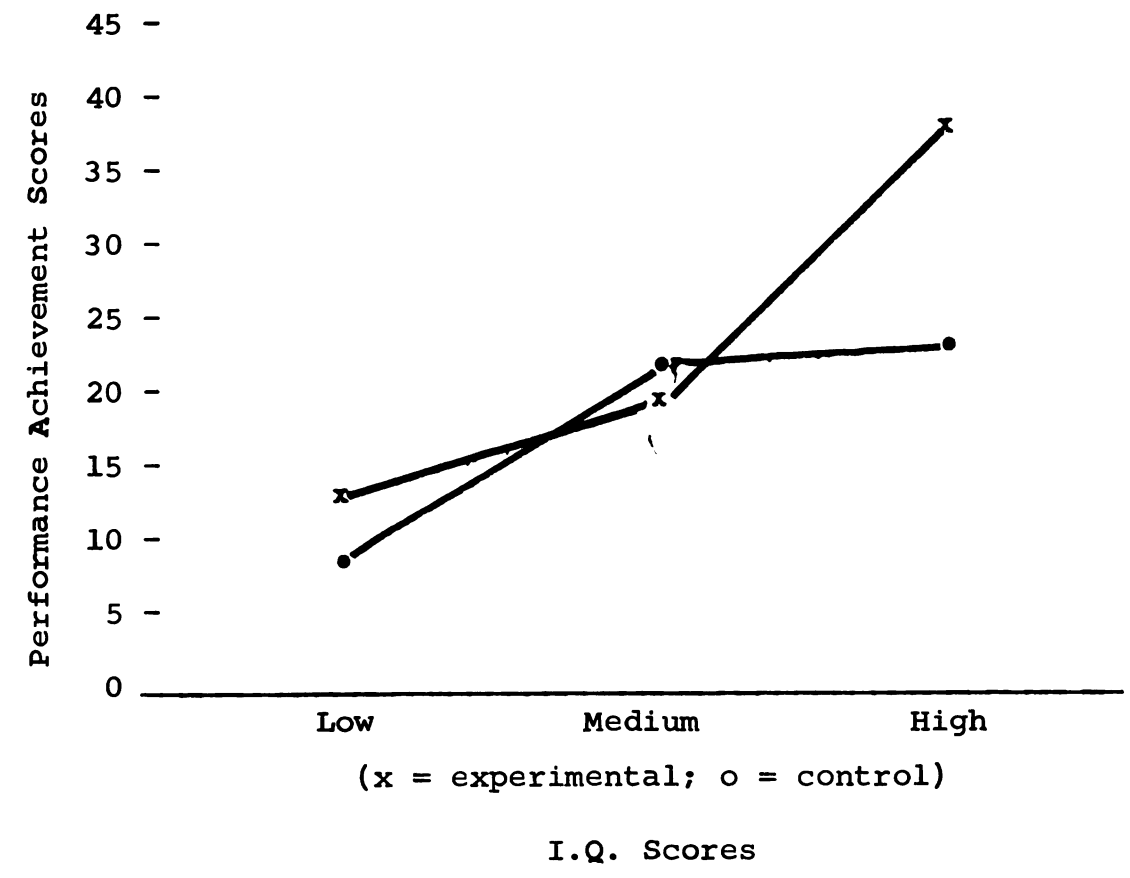


Figure 4:1. Performance Achievement Means of Experimental and Control Groups at Low, Medium, and High Levels of I.Q.

Table 4:6 contains the results of the two-way analysis of variance for the data graphed in Fig. 4:1.

Table 4:6. Analysis of Variance of Performance Achievement by Method of Instruction and Level of I.Q.

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F Statistic
Treatments	1	840	840	8.92**
I.Q. Levels	2	5005	2502.5	26.57***
Interaction	2	962	481	5.11*
Within	84	7911	94.18	
Total	89	14,718		

*Significant beyond the .025 level of confidence.
**Significant beyond the .01 level of confidence.
***Significant beyond the .001 level of confidence.

The null hypothesis that there is no significant difference in performance achievement between students receiving individual instruction within a class and students receiving ensemble class instruction is rejected. The F value of 8.92 exceeds the .01 level of confidence.

The null hypothesis that there is no significant difference in performance achievement between students of

low, medium, and high I.Q. is rejected. The F value of 26.57 exceeds the .001 level of confidence.

The null hypothesis that there is no significant interaction effect on performance achievement between method of instruction and level of I.Q. is rejected. The F value of 5.11 exceeds the .01 level of confidence.

Grade Point Average and Performance Achievement. Figure 4:2 illustrates the performance achievement scores of the experimental and control group, each trichotomized as to low, medium, and high GPA.

Besides the main effect established earlier, the graph shows the proportional relationship of GPA to the scores of all students on the dependent variable, performance achievement. The distinct interaction between Treatments and Levels seen in Figure 4:1 is less distinct in this instance. Table 4:7 contains the results of the two-way analysis of variance for the data graphed in Figure 4:2.

The null hypothesis that there is no significant difference in performance achievement between students of low, medium, and high GPA is rejected. The F value of 35.47 exceeds the .001 level of confidence.

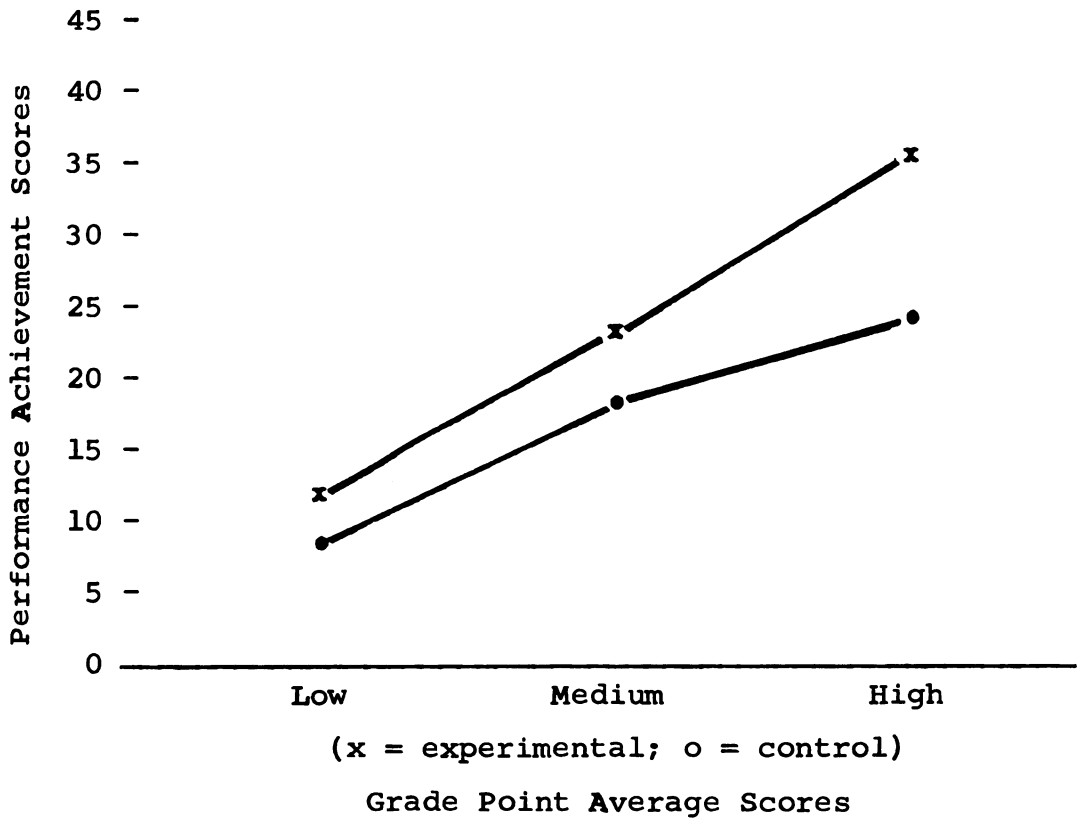


Figure 4:2. Performance Achievement Means of Experimental and Control Groups, at Low, Medium, and High Levels of Grade Point Average.

Table 4:7. Analysis of Variance of Performance Achievement by Method of Instruction and Level of GPA.

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F Statistic
Treatments	1	840	840	9.56*
GPA Levels	2	6233	3116.5	35.47**
Interaction	2	264	132	1.5
Within	84	7381	87.87	--
Total	89	14,718	--	--

*Significant beyond the .01 level of confidence.
**Significant beyond the .001 level of confidence.

The null hypothesis that there is no significant interaction effect on performance achievement between method of instruction and level of GPA is accepted. The F value of 1.5 does not reach the .05 level of confidence.

Attitude Towards Music and Performance Achievement. Figure 4:3 illustrates the performance achievement scores of the experimental and control groups, each trichotomized as to low, medium, and high levels of attitude.

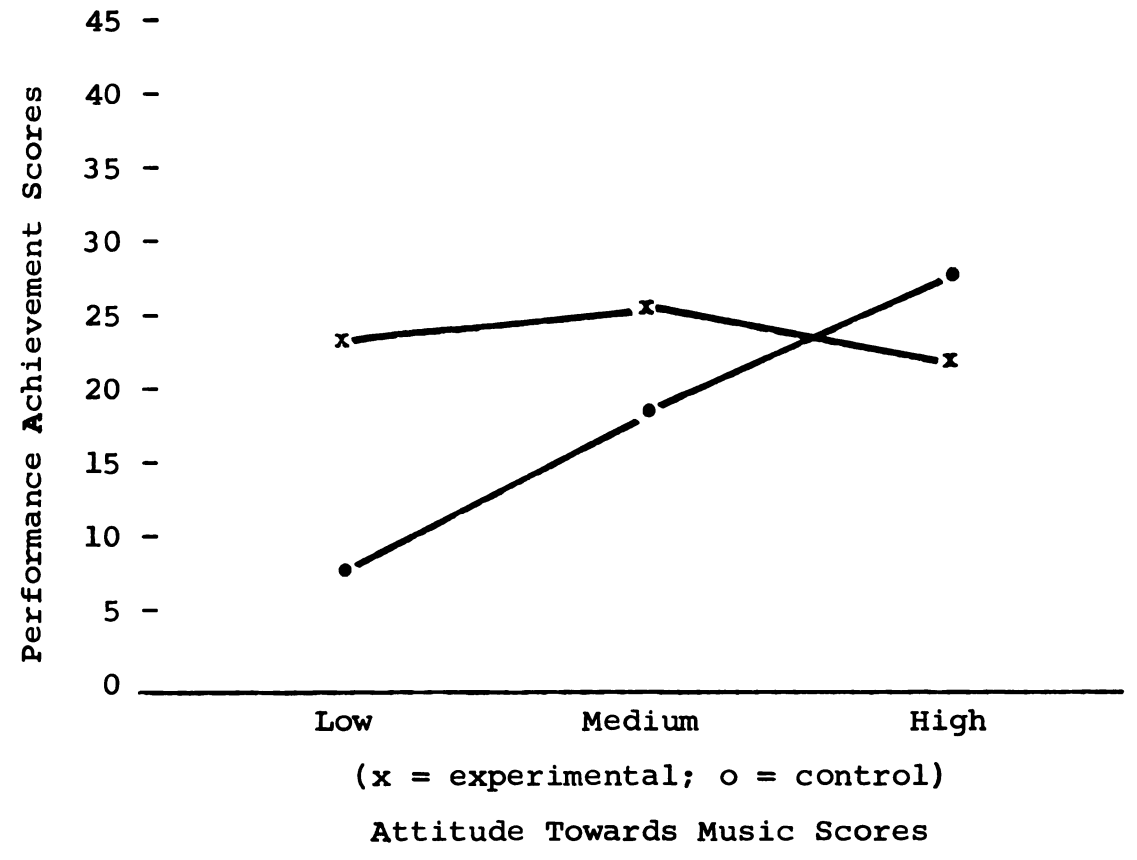


Figure 4:3. Performance Achievement Means of Experimental and Control Groups at Low, Medium, and High Levels of Attitude Towards Music.

While the performance achievement scores of students in the control group are clearly related to their test of attitude towards music, a nearly random relationship (see Table 4:4) is apparent between the two variables for students in the experimental group. Table 4:8 contains the results of the two-way analysis of variance for the data graphed in Figure 4:3.

Table 4:8. Analysis of Variance of Performance Achievement by Method of Instruction and Level of Attitude Towards Music.

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F Statistic
Treatments	1	840	840	5.87*
Attitude Levels	2	773	386.5	2.70
Interaction	2	1092	564	3.82**
Within	84	12,013	143.01	--
Total	89	14,718	--	--

*Significant beyond the .025 level of confidence.
**Significant beyond the .05 level of confidence.

The null hypothesis that there is no significant difference in performance achievement between students of low, medium, and high attitude towards music is

accepted. The F value of 2.70 does not reach the .05 level of confidence.

The null hypothesis that there is no significant interaction effect on performance achievement between method of instruction and level of attitude towards music is rejected. The F value of 3.82 exceeds the .05 level of confidence.

Musical Aptitude and Performance Achievement. Figure 4:4 illustrates the performance achievement scores of the experimental and control groups, each trichotomized as to low, medium, and high levels of MAP.

The relationship of musical aptitude to performance achievement is well-defined for both groups, and it appears to have played a similar role for each condition of instruction. Table 4:9 contains the results of the two-way analysis of variance for the data graphed in Figure 4:4.

The null hypothesis that there is no significant difference in performance achievement between students of low, medium, and high musical aptitude is rejected. The F value of 10.90 exceeds the .01 level of confidence.

The null hypothesis that there is no significant interaction effect on performance achievement between

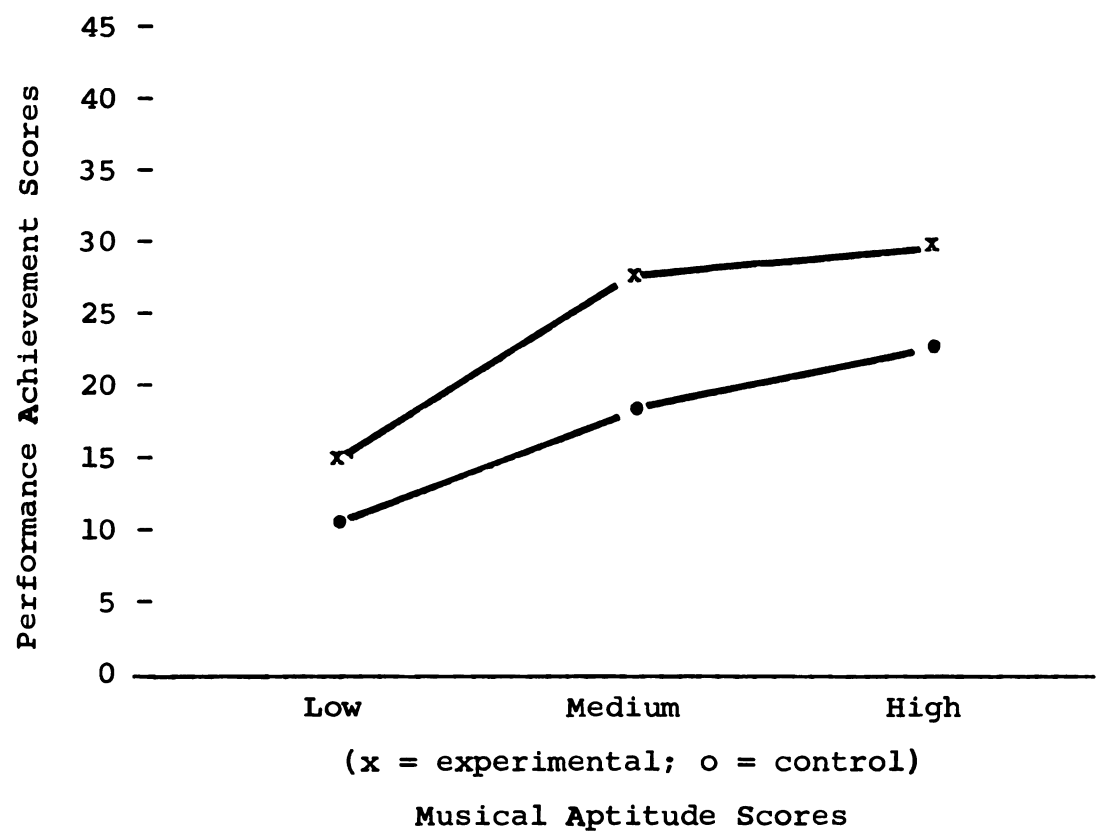


Figure 4:4. Performance Achievement Means of Experimental and Control Groups at Low, Medium, and High Levels of Musical Aptitude.

Table 4:9. Analysis of Variance of Performance Achievement by Method of Instruction and Level of MAP.

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F Statistic
Treatments	1	840	840	6.44*
MAP Levels	2	2844	1422	10.90**
Interaction	2	78	36	.27
Within	84	10,956	130.41	--
Totals	89	14,718	--	--

*Significant beyond the .025 level of confidence.
**Significant beyond the .01 level of confidence.

method of instruction and level of musical aptitude is accepted. The F value of .27 does not reach the .05 level of confidence.

Personal Adjustment and Performance Achievement. Figure 4:5 illustrates the performance achievement scores of the experimental and control groups, each trichotomized as to low, medium, and high levels of personal adjustment.

The relationship of personal adjustment to performance achievement is evident for all students in the control group and for students at medium and high levels

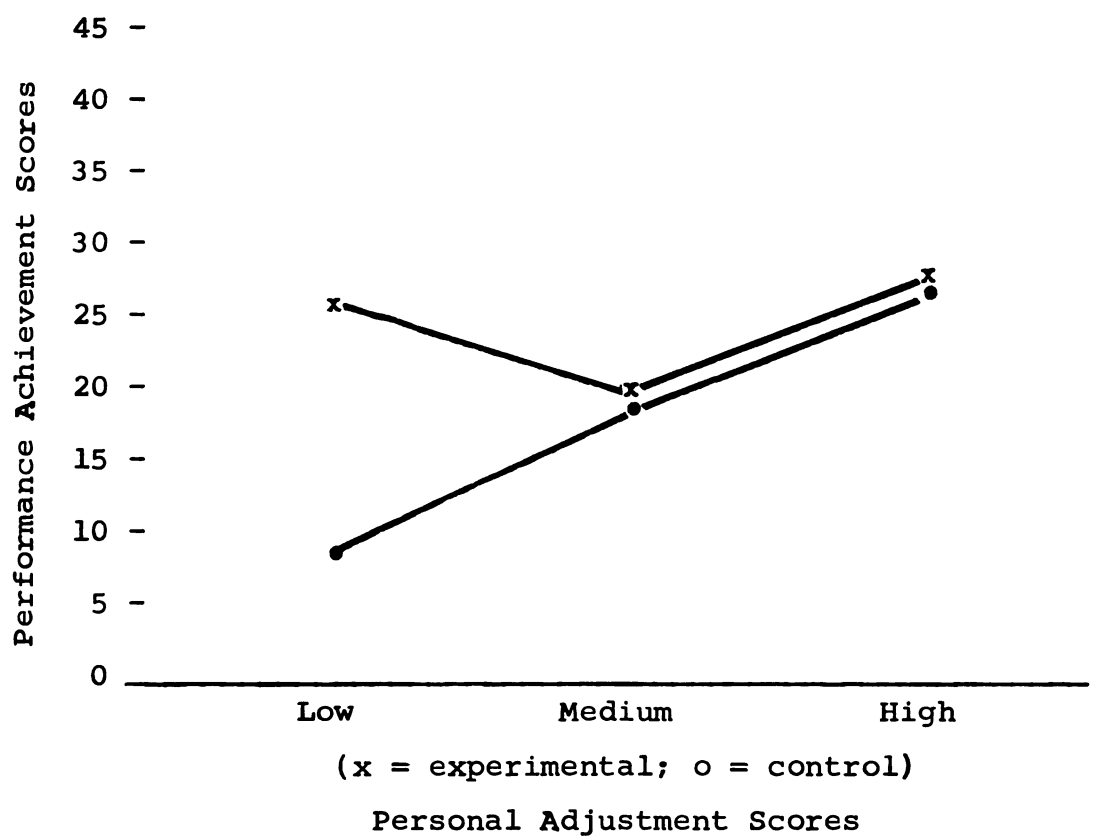


Figure 4:5. Performance Achievement Means of Experimental and Control Groups at Low, Medium, and High Levels of Personal Adjustment.

of personal adjustment in the experimental group. The interaction of Treatments and Levels is clearly shown by the disparity of performance achievement scores at the lowest level of personal adjustment. Table 4:10 contains the results of the two-way analysis of variance for the data graphed in Figure 4:5.

Table 4:10. Analysis of Variance of Performance Achievement by Method of Instruction and Level of Personal Adjustment.

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F Statistic
Treatments	1	840	840	6.78*
Personal Adjustment Levels	2	2,015	1,007.50	8.13**
Interaction	2	1,452	726	5.86**
Within	84	10,411	123.94	--
Totals	89	14,718	--	--

*Significant beyond the .025 level of confidence.
**Significant beyond the .01 level of confidence.

The null hypothesis that there is no significant difference in performance achievement between students of

low, medium, and high personal adjustment is rejected. The F value of 8.13 exceeds the .01 level of confidence.

The null hypothesis that there is no significant interaction effect on performance achievement between method of instruction and level of personal adjustment is rejected. The F value of 5.86 exceeds the .01 level of confidence.

Sex and Performance Achievement. The sex of the students played a minimal role in performance achievement, and no interaction of Treatment and sex was apparent. Table 4:11 contains the results of the two-way analysis of variance of performance achievement by method of instruction and sex.

Table 4:11. Analysis of Variance of Performance Achievement by Method of Instruction and Sex.

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F Statistic
Treatments	1	840	840	5.20*
Sex	1	5.00	5.00	.030
Interaction	1	3.00	3.00	.018
Within	86	13,870	161.40	--
Totals	89	14,718	--	--

*Significant beyond the .025 level of confidence.

The null hypothesis that there is no significant difference in performance achievement between male and female students is accepted. The F value of .030 does not meet the .05 level of confidence.

The null hypothesis that there is no significant interaction effect on performance achievement between treatments and sex is accepted. The F value of .018 does not reach the .05 level of confidence.

CHAPTER V

SUMMARY, FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study investigated the effect of tutorial instruction within the music classroom on the performance achievement of male and female instrumental beginners relative to their varying levels of I.Q., academic achievement, attitude towards music, musical aptitude, and personal adjustment.

The main hypothesis was that beginning instrumentalists of both sexes who are taught individually within the classroom will earn significantly higher scores on performance achievement than their counterparts under ensemble instruction. It was further hypothesized that students of high I.Q., grade point average, attitude towards music, musical aptitude, and personal adjustment will earn significantly higher scores on performance achievement than students of low I.Q., GPA, attitudes

towards music, musical aptitude, and personal adjustment. Finally, it was hypothesized that a significant effect on performance achievement would occur as a result of the interaction between the conditions of instruction and the five subject variables listed above.

A review of literature related to individualized instruction cited educators' early attempts to structure programs for individual differences. Music education research in this area has centered almost exclusively on the techniques and devices associated with programmed learning, and only a few studies have investigated the efficacy of individualized instruction within the classroom or on a tutorial basis. Nearly all researchers using programmed materials report the superiority of that system over conventional methods of teaching cognitive, perceptual, or performance skills. Most studies dealing with individualized learning have investigated the private lesson vs. class mode of instruction, and have been so damaged by problems of interval validity that it was difficult for the authors to draw firm conclusions from the data. The exception, Froseth's[1] study, found that

---

[1]James O. Froseth, "Using MAP Scores in the Instruction of Beginning Students in Instrumental Music," Journal of Research in Music Education, XIV (Spring, 1971), 98-101.

educational and statistically significant advantages were realized by providing beginning instrumental students with texts and instructional procedures designed to take into account individual differences.

A number of correlative studies measuring the relationship between successful participation in instrumental programs and intelligence, academic achievement, musical aptitude, and personality variables were reviewed. They indicate that these variables all bear some positive relationship to playing skills, and that intelligence and academic achievement are the most closely related to performance achievement. The author of the Musical Aptitude Profile and his colleagues from the University of Iowa, however, have presented the results of experiments which show the MAP to be the most effective predictor of instrumental skill. No trustworthy data was found concerning attitude towards music and its relationship to attainment of proficiency.

For the present experiment, two groups of subjects comprising the total enrollment of beginning instrumentalists (less three students with prior instrumental training) from two Lansing, Michigan schools participated in the study. Students in the experimental group (N = 45)

were dispersed about the classroom for the purpose of self-drill. They exclusively received tutorial instruction and evaluation only upon their request, or when they wished to progress to a succeeding unit (page) in their text. Later, when a student had acquired the cognitive and aural skill necessary for competent self-evaluation, he was allowed to proceed from unit to unit at his own discretion. Students in the control group were taught by the "ensenble" method in which the rate of unit progression is governed for all students by the teacher, and which is characterized by a surfeit of repetition for gifted students and an inadequate amount for those less talented. Both groups used the same text, and the period encompassing the study was one school year.

Data concerning I.Q., grade point average, attitude towards music, musical aptitude profile, and personal adjustment were obtained for both groups from school records or by pre-testing. Scores on the dependent variable, performance achievement, were obtained by recording each student's performance on the Watkins-Farnum Performance Scale, and submitting these recordings to an independent panel of judges.

Findings

Correlation coefficients were computed for the subject variables of I.Q., GPA, attitude towards music, musical aptitude (MAP), and personal adjustment. The similarities of these relationships between the experimental and control groups, the failure of analyses of variance to establish any significance for the small differences between paired means, and the lack of any significant differences when those variables were dichotomized by sex, led to the conclusion that the subject variables, by themselves, would not account for differences in scores on the dependent variable of performance achievement.

The hypotheses tested were divided into three main categories: 1) the effect of individual instruction on performance achievement, 2) the effect of I.Q., GPA, attitude towards music, musical aptitude, and personal adjustment on performance achievement, and 3) the effect on performance achievement of the interaction between instructional treatment and levels of the subject variables. The results of the analyses, stated in terms of null hypotheses, were as follows:

1. There is no significant difference in performance achievement between the experimental and control groups. Rejected.
2. There is no significant difference between males and females within the experimental and control groups, respectively, in performance achievement. Accepted.
3. There is no significant difference in performance achievement between students of low, medium, and high I.Q. Rejected.
4. There is no significant difference in performance achievement between students of low, medium, and high grade point average. Rejected.
5. There is no significant difference in performance achievement between students of low, medium, and high attitude towards music. Accepted.
6. There is no significant difference in performance achievement between students of low, medium, and high musical aptitude. Rejected.
7. There is no significant difference in performance achievement between students of low, medium, and high personal adjustment. Rejected.

8. There is no significant interaction effect on performance achievement between instructional treatment and sex. Accepted.
9. There is no significant interaction effect on performance achievement between instructional treatment and I.Q. Rejected.
10. There is no significant interaction effect on performance achievement between instructional treatment and GPA. Accepted.
11. There is no significant interaction effect on performance achievement between instructional treatment and attitude towards music. Rejected.
12. There is no significant interaction effect on performance achievement between instructional treatment and musical aptitude. Accepted.
13. There is no significant interaction effect on performance achievement between instructional treatment and personal adjustment. Rejected.

Discussion

The Main Effect of Treatments. This study has questioned, as have many music educators, the efficiency of the ensemble method of instruction for classes of beginning instrumentalists. Such classes involve an

educationally intolerable amount of repetitive drill which is superfluous to the learning needs of superior students. Conversely, the same drill may be inappropriate in quality or quantity to the different requirements of slower students.

Referring to the latter, it is probable that the redundancy inherent in this method is a vehicle for a permanent dependence upon rote learning, and thus promotes varying degrees of musical illiteracy in certain students.

It seems obvious that the members of a class are faced with differing musical and personal obstacles in their quest for performance facility. The teacher's ability to perceive, evaluate, and prescribe a remedy for each student's particular impediment is severely limited by the simultaneous rendition of an identical line of music. Admittedly, the teacher may focus upon a general weakness common to all beginning instrumentalists. He may even occasionally isolate and deal effectively with a single student's particular handicap. The pressure of an idle class, however, insures that the latter event will occur infrequently.

It is a plausible hypothesis that individual instruction allows the teacher to remedy the deficiencies

discussed above, thus accounting for the effect of the main treatment variable used in this study. The students were presumably able to make efficient use of their class time by limiting or increasing the amount of drill necessary for the achievement of a satisfactory level of performance. The teacher was presumably able to accurately diagnose and remedy musical defects for each student by requiring a formal, aural evaluation before the student was allowed to proceed to the next unit.

By requiring that evaluation, the teacher could directly influence the criteria against which each student measured himself. Of more significance was the fact that each student was forced to evaluate his playing <u>before</u> asking the teacher to hear the page: the request itself was an indication that the student had already engaged in self-diagnoses and improvements. This process is in marked contrast to the musical dependencies fostered by the exclusively external evaluation inherent in the ensemble method.

Finally, it is presumed that the tutorial method allowed the teacher to adjust tuition to meet the personal and differing needs of each student. The role played by

some of these factors in performance achievement is discussed below.

I.Q. and Performance Achievement. Correlative studies by other researchers have consistently shown a high positive relationship between intelligence and musical achievement. The significance found in this experiment between levels of I.Q. and performance achievement is therefore not surprising. However, the interaction* found between levels of intelligence and method of instruction leads to the tentative assumption that bright students receiving ensemble instruction are being prevented from nearing the limits of their potential. It is certainly possible that these students become frustrated when forced to perform seemingly endless repetitions of exercises played for the benefit of more mediocre classmates. It is suggested that frustration leads to boredom, and that boredom reduces motivation which in turn partially accounts for the discrepancy between the two groups' brighter students.

---

*See Figure 4:1, page 82.

It is interesting to note that Puopolo[2] found an opposite interaction when using programmed materials: students of below-average I.Q. in his experimental group registered the highest scores on the Watkins-Farnum Performance Scale, even higher than above-average I.Q. students in the same group, while students in his control group under conditions of instruction similar to this study fall into the same pattern of I.Q. and achievement observed in the control group here.

It therefore appears that programmed learning will be of greatest benefit to the less intelligent, while individual instruction aids those who are gifted. One possible reason for this phenomenon may be that programmed materials provide learning strategies to those who are incapable of developing their own effective modes of learning, while individual instruction allows or releases bright students to get on with the business in which they excel, i.e., finding their own efficient methods of learning. Puopolo's study raises another interesting question:

---

[2]Vito Puopolo, "The Development and Experimental Application of Self-Instructional Practice Materials for Beginning Instrumentalists," (unpublished Ph.D. dissertation, Michigan State University, 1970).

Does programmed practice deprive bright students of learning strategies, thereby lowering their scores on tests of performance achievement?

GPA and Performance Achievement. While a student's grade point average is not, strictly defined, a personal attribute, it may be partially considered an indication of a willingness or reluctance to achieve scholastic success. Viewed in that light, the significant differences relating to performance achievement between levels of GPA were predictable. The somewhat disappointing failure to find a significant interaction between instructional treatments and levels of GPA may indicate a failure on the part of the experimental instructor to properly motivate students with lower scholastic aspirations. It may also reveal the degree to which such students' motivations are resistant to change.

Attitude Towards Music and Performance Achievement. The most striking disparity between the experimental and control groups centered on the relationship of attitude to performance achievement. While levels of attitude did not appear to account for significant differences in performance achievement, the relationship between the two variables in the control group ($r = .669$) was apparently

masked by the nearly random (r = .054) relationship found in the experimental group. This was reflected in the significant interaction found between levels and treatments.

It is difficult to accurately account for this phenomenon. The instrument used for measuring attitude towards music may have been too unreliable or crude to consistently and validly measure the variable. Considering its extensive preparation and use by its author in widely differing geographic locations, however, there is little evidence by which its findings can be refuted.

Alternative hypotheses must lie within the experimental and/or control classrooms. A student's attitude towards music must influence to some extent his attitude toward the music class. The latter will be perceived by the instructor and his attitude towards that student will be influenced accordingly. A student can quite easily perceive a teacher's attitude towards him, and may change his behavior in class with results amenable or detrimental to his musical achievement.

In other words, the differing attitudinal effects on performance achievement found in this study may be a result of differences between instructors. Although nearly all teachers strive to accept without bias the

personal qualities of their students, they meet with varied success in doing so. The extent to which a teacher can accept a student's attitude plays some role in determining that student's achievement. It is probable that the differences discussed here between the experimental and control groups reflect the differing ability of each group's teacher to accept or ignore the "negative" attitudes of some students.

Musical Aptitude and Performance Achievement. The effect of musical aptitude on performance achievement was not unexpected, and it duplicated the results of virtually every research study extant which has compared the two variables. The reasons for the influence of aptitude upon achievement seem obvious and need no explanation here.

In agreement with Froseth's[3] findings, however, this study found that no particular advantage could be claimed for the individual instruction of students with differing levels of musical aptitude. These results would seem to indicate that musical aptitude seeks its outlet in behavior regardless of instructional conditions.

---

[3]Froseth, op. cit.

Personal Adjustment and Performance Achievement. The results show that students at higher levels of personal adjustment attain significantly higher levels of performance achievement. More importantly, the significant interaction of treatments and levels at the lowest level of personal adjustment holds serious implications for teachers who continue to use the ensemble method of instruction. Students of low personal adjustment who receive individual instruction are able to attain virtually identical results as students of high personal adjustment, while their counterparts in the control group rank lowest in performance achievement. This finding lends credence to the supposition that individual instruction may allow a teacher to give support and encouragement to students in areas other than musical, and prevent personal handicaps from adversely affecting their attainment. Conversely, it is an indictment of uniform teaching methods which apparently prevent students from reaching potential levels of success.

Noise. It is obvious that the experimental classrooms were noisy. Stated more precisely, those classrooms were continually cacophonous; measured in decibels and given an equal number of students for both kinds of

classes, however, the level of sound in each would be nearly identical. Noise, of course, is an impediment to perception, but only related to the students' ability to screen it out. The seriousness of this issue must be determined by the results of this experiment, and other factors have apparently more than compensated for its assumed disadvantage. Perhaps the best indication of its influence is that no student ever complained of it.

Conclusions

Based upon the analysis of the data from the investigation, the following conclusions are admissible:

1. When junior high school beginning instrumentalists are instructed by the individual methods described earlier in this study, a moderate increase in performance achievement is noted.
2. Students of higher I.Q., grade point average, musical aptitude and personal adjustment exhibit significantly greater performance achievement than students of lower levels for the same attributes.

3. Individually-instructed students of the highest level of I.Q. and lowest levels of attitude towards music and personal adjustment receive the greater benefits, in terms of performance achievement, from that mode of instruction.

Implications

The adoption of an individual instruction method as described in this study would have the following implications for instrumental music education:

1. A more efficient, rapid growth in the performance achievement of individuals together with an increase of performance capabilities for junior high school instrumental groups may be attained.
2. The development of musical self-reliance and realistic self-evaluation would presumably be encouraged.
3. The drop-out of bright students from instrumental music programs cited by Kruth[4] may be

---

[4]E. C. Kruth, "Student Drop-out in Instrumental Music in the Secondary Schools of Oakland, California," (unpublished Ph.D. dissertation, Stanford University, 1964).

reduced by minimizing the repetition and resultant boredom experienced by those students.

4. Opportunities for the teacher to provide for individual differences, both musical and non-musical, will be greatly increased.

Recommendations

1. A similar investigation, using programmed material, such as those conducted by Puopolo,[5] together with the use of varied and appropriate instructional texts, is recommended. These additions may particularly influence the achievement of students of lower intelligence and ability.
2. A study should be made at other grade levels of instrumental study to determine whether effects noted herein will similarly appear.

---

[5]Puopolo, op. cit.

BIBLIOGRAPHY

BIBLIOGRAPHY

Books

Atkinson, Caroll, and Maleska, Eugene. The Story of Education. New York: Bantam Books, 1962.

Billet, Roy O. The Administration and Supervision of Homogeneous Grouping. Ohio State University Press, 1932.

Bishop, Lloyd K. Individualizing Educational Systems. New York: Harper and Row, 1971.

Carter, Launor F. "Computers: Their Impact on Instruction, on Educational Planning, and on the Curriculum." Cited in Lloyd K. Bishop, Individualizing Educational Systems. New York: Harper and Row, 1971.

Cornell, E. L. "Effects of Ability Grouping Determinable from Published Studies," The Ability Grouping of Pupils. Thirty-fifth Yearbook of the National Society for the Study of Education, Part I. Bloomington, Ill.: Public School Publishing Co., 1936.

Douglas, J. W. B. The Home and the School: A Study of Ability and Attainment in the Primary Schools. London: MacGibbon and Kee, 1964.

Duerkson, George. Teaching Instrumental Music. Washington, D.C.: MENC, 1972.

Edwards, Allen. Techniques of Attitude Scale Construction. New York: Appleton-Century-Crofts, Inc., 1957.

Elliot, Charles W. "Shortening and Enriching the Grammar School Course." Charles Elliot and Popular Education. Edited by Edward Krug. New York: Teachers College Press, 1961.

Frost, S. E., Jr. History of Education. Woodbury, New York: Barrows Educational Series, Inc., 1947.

Gibbons, Maurice. Individualized Instruction. New York: Teachers College Press, 1971.

Glaser, Robert. Adapting the Elementary School Curriculum to Individual Performance. Pittsburgh: University of Pittsburgh Learning Research and Development Center, Reprint 26, 1967.

Good, Carter B., ed. Dictionary of Education. 2nd ed. New York: McGraw-Hill, 1959.

Goodland, J. I. "Classroom Organization." Encyclopedia of Educational Research. Edited by C. W. Harris. New York: MacMillan and Co., 1960.

Guilford, J. P. The Nature of Human Intelligence. New York: McGraw-Hill, Inc., 1967.

Harap, H. "Differentiation of Curriculum Practices and Instruction in Elementary Schools." The Grouping of Pupils. Edited by G. M. Whipple. Thirty-fifth Yearbook of the National Society for the Study of Education, Part I. Bloomington, Ill.: Public School Publishing Co., 1936.

Harris, Chester W., ed. Encyclopedia of Educational Research. New York: Macmillan Co., 1960.

Komensky, Jon A. The Analytical Didactic of Comenius. Chicago: University of Chicago Press, 1953.

Minor, Frances. "A Child Goes Forth: Ideas Invite Involvement." Individualizing Instruction. Edited by R. C. Dell. Washington, D.C.: Association for Supervision and Curriculum Development, National Education Association, 1964.

Noffsinger, John S. Correspondence Schools, Lyceums, Chautaquas. New York: Macmillan Co., 1926.

Parkhurst, Helen. Education on the Dalton Plan. New York: Dutton, 1922.

Postlewaith, S. N., and Novak, Joseph D. "The Use of 8mm Loop Films in Individualized Instruction," Annals of the New York Academy of Science. New York: The New York Academy of Science, 1967.

Rouse, W. H. D. (trans.). Great Dialoques on Plato. Mentor Books. New York: The New American Library, 1956.

Scanlon, Robert G., and Belvin, John O. Individually Prescribed Instruction. Philadelphia: Research for Better Schools, Inc., 1969.

Shane, H. G. "The School and Individual Differences." Individualizing Instruction. Edited by Nelson B. Henry. Sixty-first Yearbook of the National Society for the Study of Education. Chicago: The University of Chicago Press, 1962.

Skinner, B. F. The Technology of Teaching. New York: Appleton-Century-Crofts, 1968.

Thomas, R. M., and Thomas, S. M. Individual Differences in the Classroom. New York: McKay Company, Inc., 1965.

Thurstone, Louis L., and Chave, E. J. The Measurement of Attitudes. Chicago: University of Chicago Press, 1929.

Wallach, M. A., and Kogan, N. Modes of Thinking in Young Children. New York: Holt and Co., 1965.

Washburn, Carleton, and Marland, Sidney P., Jr. Winnetka: The History and Significance of an Educational Experiment. Englewood Cliffs, New Jersey: Prentice-Hall, 1963.

Watkins, John. Objective Measure of Instrumental Performance. New York: Teacher's College Bureau of Publications, Columbia University, 1942.

Whipple, Guy M., ed. Adapting the Schools to Individual Differences. Twenty-fourth Yearbook of the National Society for the Study of Education, Part II. Chicago: The University of Chicago Press, 1925.

Wyndham, H. S. Ability Grouping. Melbourne: Melbourne University Press, 1934.

Yates, Alfred, ed. Grouping in Education. New York: John Wiley and Sons, Inc., 1966.

Manuals

Gordon, E. Musical Aptitude Profile Manual. Boston: Houghton Mifflin Co., 1965.

Otis, Arthur S., and Lennon, Roger T. Otis-Lennon Mental Ability Test, Intermediate Level. New York: Harcourt, Brace and World, Inc., 1967.

Thorpe, L., Clark, W., and Tiegs, E. California Test of Personality, 1953 Revision. Monterey, California: California Test Bureau/McGraw Hill Co., 1953.

Watkins, John G., and Farnum, Stephen E. The Watkins-Farnum Performance Scale. Winona, Minnesota: Hal Leonard Music, Inc., 1954.

Periodicals

Adams, E. N. "Computer-Assisted Instruction." Computers and Automation, (March, 1966), 17-18.

Ashford, T. H. A. "The Use of Programmed Instruction to Teach Fundamental Concepts in Music Theory." Journal of Research in Music Education, XIII (Winter, 1965), 171-177.

Daniels, J. C. "The Effects of Streaming in the Primary Schools." The British Journal of Psychology, XXXI (July, 1961), 75-81.

Froseth, James O. "Using MAP Scores in the Instruction of Beginning Students in Instrumental Music." Journal of Research in Music Education, XIV (Spring, 1971), 98-101.

Gordon, Edwin. "A Study of the Efficacy of General Intelligence and Musical Aptitude Tests in Predicting Achievement in Music." Council of Research in Music Education, Bulletin No. 13 (Spring, 1968), 40-45.

_____. "The Musical Aptitude Profile." Music Educators Journal, 53:6 (February, 1967), 52-55.

Hargiss, Genevieve F. "The Acquisition of Sight Singing Ability in Piano Classes for Students Preparing to be Elementary Teachers." Journal of Research in Music Education, X (Spring, 1962), 69-75.

LaBach, Parker. "A Device to Facilitate Learning of Basic Music Skill." Council for Research in Music Education, Bulletin No. 4 (Winter, 1965), 7-10.

Mayer-Oakes, G. H. "The Dalton Plan in a Small High School." The Education Journal, No. 57 (December, 1936), 244-248.

Miller, W. S., and Otto, M. J. "Analysis of Experimental Studies in Homogeneous Grouping." The Journal of Educational Research, XXI (Jan.-May, 1930), 76-101.

Millman, J., and Johnson, M. "Relation of Section Variance to Achievement Gains in English and Mathematics in Grades Seven and Eight." American Education Research Journal, I (1964), 42-53.

Noble, Robert F. "Critique." Council of Research in Music Education, No. 21 (Summer, 1970), 47-51.

Pearse, B. H. "The Postman is the Proctor." American Education, III (February, 1967), 10-12.

Rock, Robert T. "Critical Study of Current Practices in Ability Grouping." Educational Research Bulletin, IV,V,VI (May-June, 1929), 3-17.

Rubin-Rabson, Grace. "Studies in the Psychology of Memorizing Piano Music VI: A Comparison of Two Forms of Mental Rehearsing and Keyboard Over-learning." Journal of Educational Psychology, XXXII (June, 1941), 593-602.

Schneider, Erwin, and Cady, Henry. "Evaluation and Synthesis of Research Studies Relating to Music Education: 1930-1962." Council of Research in Music Education, Bulletin No. 9 (Spring, 1967), 4-9.

Search, Preston. "The Pueblo Plan of Individual Teaching." Educational Review, VIII (June, 1894), 154-158.

Small, T. S. "The Evaluation of Clarinet Tone Through the Use of Oscilloscopic Transparencies." Journal of Research in Music Education, XV (Spring, 1967), 11-22.

Thompson, W. H. "Experiment with the Dalton Plan." The Journal of Education Research, XXVI (Sept.-May, 1933), 493-500.

Turney, A. H. "The Status of Ability Grouping." Education Administration and Supervision, XVII (January-February, 1931), 126-127.

Underhill, R. J. "Experience of Scarsdale with Individual Instruction." New York State Education Journal, XVII (March, 1931), 677-678.

Texts

Weber, Fred. First Division Band Method. Rockville Center, Long Island: Belwin, 1962.

Unpublished Material

Appleby, B. C. "The Effects of Individualized Reading on Certain Aspects of Literature Study with High School Seniors." Unpublished Doctoral dissertation, University of Iowa, 1967.

Armstrong, W. H. "An Experimental Investigation of the Instructional Effectiveness of Published Programmed Instructional Materials vs. Individualized Instruction in Area Vocational-Technical Schools." Unpublished Doctoral dissertation, The Florida State University, 1967.

Becker, W. R. "The Effect of Overlearning, Initial Learning Ability and Review Upon the Musical Memory of Junior High School Cornet and Trumpet Players." Unpublished Doctoral dissertation, State University of Iowa, 1962.

Bergen, Hal. "A Study of Drop-outs in Instrumental Music in Five Selected High Schools in Michigan." Unpublished Doctoral dissertation, Michigan State University, 1957.

Boley, D. M. "The Development and Evaluation of the Effectiveness of a Pilot Instructional Sound-Film for Teaching Beginning Trumpet Students with a Brief Survey of the History of Trumpet Instruction and the History of Educational Film Research." Unpublished Doctoral dissertation, University of Iowa, 1970.

Carlsen, James C. "An Investigation of Programmed Learning in Melodic Dictation by Means of a Teaching Machine using a Branching Technique of Programming." Unpublished Doctoral dissertation, Northwestern University, 1962.

Carter, W. "Ethnic Music as a Source for the Musical Development and Enrichment of Culturally Different Students in General Music Classes." Unpublished Doctoral dissertation, Michigan State University, 1970.

Cooley, John C. "A Study of the Relation Between Certain Mental and Personality Traits and Ratings of Musical Abilities." Unpublished Doctoral dissertation, University of Michigan, 1952.

Corno, Guy. "Relationship Between the Degree of Intelligence and Performance on a Test of Musical Aptitude." Unpublished Masters thesis, Dusquesne University, 1958.

Cramer, William. "The Relation of Maturation and Other Factors to Achievement in Beginning Instrumental Music Performance at the 4th through 8th Grade Levels." Unpublished Doctoral dissertation, Florida State University, 1958.

Difronzo, R. F. "A Comparison of Tachistoscopic and Conventional Methods in Teaching Grade Three Music Sight-Playing on a Melody Wired Instrument." Unpublished Doctoral dissertation, University of Connecticut, 1966.

Farnum, Stephen. "Prediction of Success in Instrumental Music." Unpublished Doctoral dissertation, Harvard University, 1950.

Froseth, James O. "Individualizing Instruction in the Beginning Music Class." Unpublished paper presented at the North Central Division MENC Convention, Research Section, 1971.

Kaplan, Lionel. "The Relationship Between Certain Personality Characteristics and Achievement in Instrumental Music." Unpublished Doctoral dissertation, New York University, 1961.

Kruth, E. C. "Student Drop-out in Instrumental Music in the Secondary Schools of Oakland, California." Unpublished Doctoral dissertation, Stanford University, 1964.

McCarley, W. W. "An Experimental Study to Evaluate the Effectiveness of an Individualized Instructional Method and Lecture-Discussion Method of Teaching Vocational Agriculture Classes." Unpublished Doctoral dissertation, Michigan State University, 1969.

Mitchum, John. "The Wing 'Standardized Tests of Musical Intelligence'; An Investigation of Predictability with Selected Seventh Grade Beginning Band Students." Unpublished Doctoral dissertation, Florida State University, 1969.

Pruitt, Jack S. "A Study of Withdrawals in the Beginning Instrumental Music Programs of Selected Schools in the School District of Greenville, South Carolina." Unpublished Doctoral dissertation, New York University, 1966.

Puopolo, Vito. "The Development and Experimental Application of Self-Instructional Practice Materials for Beginning Instrumentalists." Unpublished Doctoral dissertation, Michigan State University, 1970.

Rhoades, Fordyce L. "An Evaluation of Measures for the Prediction of Success in Instrumental Study." Unpublished Masters thesis, University of Washington, 1938.

Schleuter, Stanley L. "An Investigation of the Interrelation of Personality Traits, Musical Aptitude and Musical Achievement." Unpublished Doctoral dissertation, University of Iowa, 1971.

Shugert, James M. "An Experimental Investigation of Heterogeneous Class and Private Methods of Instruction with Beginning Instrumental Music Students." Unpublished Doctoral dissertation, University of Illinois, 1969.

Spohn, C. L. "An Exploration in the Use of Recorded Teaching Material to Develop Aural Comprehension in College Music Classes." Unpublished Doctoral dissertation, Ohio State University, 1959.

Thayer, Robert W. "An Investigation of the Interrelation of Personality Traits, Musical Achievement, and Different Measures of Musical Aptitude." Unpublished Doctoral dissertation, University of Iowa, 1971.

Waa, Loren Roger. "An Experimental Study of Class and Private Methods of Instruction in Instrumental Music." Unpublished Doctoral dissertation, University of Illinois, 1965.

Wardian, J. F. "An Experiment Concerning the Effectiveness of Programmed Learning for Use in Teaching the Fundamentals of Music." Unpublished Doctoral dissertation, Washington State University, 1963.

Young, William Thomas. "An Investigation of the Relative and Combined Power of Musical Aptitude, General Intelligence, and Academic Achievement Tests to Predict Musical Attainment." Unpublished Doctoral dissertation, University of Iowa, 1969.

APPENDIX A

APPENDIX A

ANALYSES OF VARIANCE FOR THE CRITERION VARIABLES OF I.Q., GPA, ATTITUDE TOWARDS MUSIC, MUSICAL APTITUDE, AND PERSONAL ADJUSTMENT, BY SCHOOL AND SEX

Table A:1. I.Q. Means and Standard Deviations for Males and Females, Pattengill JHS and Rich JHS.

	Pattengill JHS		Rich JHS	
	Mean	SD	Mean	SD
Males	34.10	18.05	35.50	14.00
Females	35.30	18.49	36.92	15.51

Table A:2. Analysis of Variance of I.Q. Scores by School and Sex.

Source	df	SS	MS	F	p
Schools	1	49.88	49.88	.175	N.S.
Sex	1	38.02	38.02	.133	N.S.
Schools x Sex	1	.26	.26	.001	N.S.
Within	86	24,522.17	285.14		
Total	89	24,610.33			

Table A:3. GPA Means and Standard Deviations for Males and Females, Pattengill JHS and Rich JHS.

	Pattengill JHS		Rich JHS	
	Mean	SD	Mean	SD
Males	2.36	.76	2.51	.81
Females	2.42	.78	2.43	.81

Table A:4. Analysis of Variance of Grade Point Averages By School and Sex.

Source	df	SS	MS	F	p
Schools	1	.05	.05	.08	N.S.
Sex	1	.11	.11	.17	N.S.
Schools x Sex	1	.33	.33	.53	N.S.
Within	86	53.46	.622		
Total	89	53.95			

Table A:5. Attitude Towards Music Means and Standard Deviations for Males and Females, Pattengill JHS and Rich JHS.

	Pattengill JHS		Rich JHS	
	Mean	SD	Mean	SD
Males	10.84	2.35	16.19	3.00
Females	17.28	2.13	16.11	3.11

Table A:6. Analysis of Variance of Attitude Towards Music Scores by School and Sex.

Source	df	SS	MS	F	p
Schools	1	17.07	17.07	2.37	N.S.
Sex	1	.75	.75	.10	N.S.
Schools x Sex	1	1.54	1.54	.21	N.S.
Within	86	619.57	7.20		
Total	89	638.93			

Table A:7. Musical Aptitude Profile Means and Standard Deviations for Males and Females, Pattengill JHS and Rich JHS.

	Pattengill JHS		Rich JHS	
	Mean	SD	Mean	SD
Males	51.92	9.39	51.92	8.71
Females	49.80	7.80	51.40	6.40

Table A:8. Analysis of Variance of Musical Aptitude Scores by School and Sex.

Source	df	SS	MS	F	p
Schools	1	20.54	20.54	.30	N.S.
Sex	1	46.88	46.88	.68	N.S.
Schools x Sex	1	28.89	28.89	.42	N.S.
Within	86	5900.59	68.61		
Total	89	5996.90			

Table A:9. Personal Adjustment Means and Standard Deviations for Males and Females, Pattengill JHS and Rich JHS.

	Pattengill JHS		Rich JHS	
	Mean	SD	Mean	SD
Males	54.35	16.13	57.44	14.27
Females	56.79	15.97	55.05	11.12

Table A:10. Analysis of Variance of Personal Adjustment Scores by School and Sex.

Source	df	SS	MS	F	p
Schools	1	22.50	22.50	.11	N.S.
Sex	1	.01	.01	.00	N.S.
Schools x Sex	1	129.00	129.00	.61	N.S.
Within	86	18,340.15	213.26		
Total	89	18,491.66			