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# A Comparative Study of the I. Q. and Grade Differences between Music Students and Other High School Students in the Okanogan Schools for 1958-1959

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A COMPARATIVE STUDY OF THE I. Q. AND GRADE DIFFERENCES  
BETWEEN MUSIC STUDENTS AND OTHER HIGH SCHOOL STUDENTS  
IN THE OKANOGAN SCHOOLS FOR 1958-1959

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A Thesis  
Presented to  
the Graduate Faculty  
Central Washington State College

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Education

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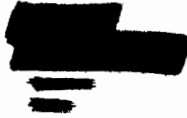
by  
Wayte A. Kirchner  
August 1962

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SPECIAL  
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APPROVED FOR THE GRADUATE FACULTY

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Wayne S. Hertz

#### ACKNOWLEDGMENT

Special indebtedness is extended to Dr. Herbert A. Bird for his time, effort, and patience that helped make possible the preparation of this thesis. Appreciation is also expressed to Dr. Wayne S. Hertz and Dr. Donald Goetschius for their invaluable assistance.

## TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION AND STATEMENT OF THE PROBLEM . . . . .	1
The Problem . . . . .	2
Statement of the problem . . . . .	2
Importance of the study . . . . .	2
Limitations of the Study . . . . .	3
Administration of the tests . . . . .	3
Number included in the study . . . . .	3
Area of the study . . . . .	4
Grade computations in the study . . . . .	4
Definition of Terms Used . . . . .	4
Music students . . . . .	4
Non-music students . . . . .	4
School music climate . . . . .	4
"Whole child" . . . . .	4
Mean average . . . . .	4
<u>t</u> score . . . . .	5
Level of significance . . . . .	5
Organization of the Succeeding Chapters . . . . .	5
II. REVIEW OF RELATED LITERATURE . . . . .	6
III. PROCEDURE OF THE STUDY . . . . .	13
IV. FINDINGS AND INTERPRETATION OF DATA GATHERED . . . . .	15

CHAPTER	PAGE
Grades . . . . .	15
Intelligence quotient scores . . . . .	18
<u>t</u> score . . . . .	18
V. CONCLUSIONS AND SUMMARY . . . . .	23
Music students . . . . .	23
Choral students . . . . .	24
Band students . . . . .	24
BIBLIOGRAPHY . . . . .	27
APPENDIX A: DATA FOR EXPERIMENTAL GROUP . . . . .	30
APPENDIX B: LETTER OF REQUEST . . . . .	35
APPENDIX C: TALLY CHARTS . . . . .	37

LIST OF TABLES

TABLE	PAGE
I. Mean Intelligence Quotient Scores and Grade Point Averages . . . . .	16
II. <u>t</u> Score of Significance, Sample Problem . . . . .	21
III. <u>t</u> Score of Significance of Groups Compared for G. P. A. and I. Q. . . . .	22



LIST OF FIGURES

FIGURE	PAGE
1. Grade Point Averages . . . . .	17
2. Intelligence Quotient Test Averages . . . . .	20

## CHAPTER I

### INTRODUCTION AND STATEMENT OF THE PROBLEM

"We cannot lead men toward an ideal if they will not follow, and they will not follow if they cannot understand" (2:55). Can students be expected to become well rounded citizens if knowledge of their cultural background is not complete? In most schools the students learn about culture through history, English, or science, the arts being neglected. Although a comprehensive study of the arts includes painting, sculpture, drama, dance, architecture, literature, and music, the main concern of this paper will be music.

A study of the arts has more than tradition behind it. An understanding of the arts enables man to create and express his emotions, providing a means of communication essential in the present society. Furthermore, the arts teach a self-discipline which grows more intense as one approaches mastery. In support of this, Griswald states that "music presents as rigorous a challenge to the human mind and offers it as keen a discipline as any of the subjects conventionally identified with liberal education" (2:54).

Music must be fostered in the schools if students are to receive a complete education. A partial reason for the neglect of musical training can be traced to the state requirements for high school graduation. With the exception of music, the main subject fields list some required course or courses. It may be that music is not placed on an equal basis with other subjects because some of those responsible for

graduation requirements, and school administrators, who set up the curriculum, may not have had sufficient facts concerning the value of music in the schools. Is it not the duty of public schools to see that students broaden and enrich their cultural background through music education? "Art has no enemy but an ignorant man" (2:56).

## I. THE PROBLEM

Statement of the problem. The primary purpose of this study was to determine whether or not there is any significant difference in academic achievement and intelligence quotient rating between two main groups of high school students: (1) those students enrolled in music classes and (2) those students not enrolled in music classes.

A second purpose was to provide the administrators of Okanogan County Schools with valid evidence in support of maintaining music courses in the high school curriculum (Chapter V).

It was assumed that there would be a significant difference in the academic achievement and intelligence rating between the groups compared. It was expected that students enrolled in music would have higher academic and I. Q. ratings than students not enrolled in music.

Importance of the study. Mere opinion based on personal judgment, however, is not enough to provide administrators and music educators with accurate information as to the ability of students and as to music's importance in the curriculum. Such can be done only through statistical investigation as described in the above comparisons. It is hoped that substantial facts produced will prove that music courses are

a valuable and essential part of the educational program.

Like many other areas of instruction, music education has had to struggle for adequate recognition leading to academic respectability. It cannot serve girls and boys and meet their varied needs until it is brought into the curriculum as a functional and regular part of the total school program. Music considered as a special subject in the curriculum or an extracurricular subject cannot make an adequate contribution to the general objectives of education (3:15).

## II. LIMITATIONS OF THE STUDY

Administration of the tests. The intelligence tests used as sources of data in this investigation were not administered by any one person nor at any specific time. Each school had given the tests prior to the time the data was gathered, recording the results on the students' permanent record cards, from which source the data for this study was collected. The I. Q. test used was the Otis Quick-Scoring Mental Maturity Test.

Number included in the study. This investigation includes 200 students (50 from each of the four high school grade levels) chosen by a random sampling of 682 students enrolled in Okanogan County Schools. Of the 200 students, only 32 were enrolled in band and/or chorus; therefore, to be able to use the t test of significance (in which groups compared must be in pairs), the other groups of students were limited to 32 in each. Because of the previous random sampling, only the first 32 students in each group were used.

This study involves only four schools in Okanogan County: Coulee Dam High School, Omak High School, Winthrop High School, and Oroville High School. Insufficient student records made gathering data from the

other schools valueless. The random sampling of pairs of 32 students is believed to be sufficient to produce valid conclusions from the results in this study.

Area of the study. This study was confined to one particular county, which obviously has its own individual problems; therefore, the same results may not necessarily be produced by a similar study in other areas.

Grade computations in the study. The students' academic achievement for the 1958-1959 school year provided the basis from which the grade point averages were derived.

### III. DEFINITION OF TERMS USED

Music students. Music students are those high school students enrolled in band and/or choral classes.

Non-music students. Non-music students are those high school students not enrolled in band or choral classes.

School music climate. School music climate is the attitude that the students, teachers, and administration have toward music.

"Whole child." The "whole child" indicates that a general education takes place, with all types of knowledge growing together in the individual.

Mean average. The mean average is that average found by adding all of the scores and dividing by the number of scores used.

t score. This term is defined as

. . . testing the significance of the difference between two sample means, by dividing the difference by the standard error of the difference and referring the obtained value to the table of  $t$  (1:295).

One must fully understand this particular definition to interpret the results of this study.

Level of significance. The level of significance for  $t$  score indicates that in a similar study different findings would be due to chance not more than the percentage of time stipulated. For example, a one per cent level of significance means that in a similar study different findings would be due to chance not more than one per cent of the time (1:299).

#### IV. ORGANIZATION OF THE SUCCEEDING CHAPTERS

Chapter II will review the literature relating to the importance of music in the high school curriculum.

Chapter III will give the procedures involved in gathering data.

The computation of the data gathered will be given in Chapter IV.

Chapter V will contain the summary and conclusions of the study.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

Can this study provide the administrators of the Okanogan County Schools with a sound reason for keeping music courses in the curriculum with a time allotment equal to that of other subject areas? This question is of vital importance to the music educator, because at the present time there seems to be a trend by both students and administrators to subordinate music to some other required subject. In this connection, affirming music's significance, Mursell states:

Music is a very important element in our common culture. From the earliest times it has played a notable and imposing part in the common life of western civilization. It is the right of every child to be brought into touch with the significant elements of his cultural heritage. . . . Most people derive much pleasure from musical experience and activities (7:255,256).

Another statement by Mursell further substantiates music's importance in the curriculum:

The school is merely an institution set apart to do consciously and planfully what the rest (experience, society, etc.) do incidentally and without deliberate intent. And the music program should be a standing revelation of the meaning of school life, and of how the school may best set about its task of molding personality and shaping life. The very derived meaning of the word "school" signifies "leisure." Therefore, being a pupil should mean freedom from the pressing and encroaching cares of earning a living, opportunity for wide and fruitful contacts and enlightening activities, and a chance to broaden the horizons of the mind, to expand his interests, and grow mentally. A wise educational administration seeks to provide for every pupil just such chances (7:229-230).

A possible answer to the question at the beginning of this chapter may be found by elaborating on the benefits of music and by proving statistically that in school courses music students have

significantly higher grade point averages for their I. Q. than students not in music.

Here something regarding the validity and consistency of I. Q. measurement might be stated because of its vital importance in the statistics to be listed in this study.

I. Q.s are not constant but vary considerably within limits. Variation of I. Q.s may be due to the manner in which a test is given or scored, to the fact that they are derived from tests standardized on different populations, or even to the fact that one child cheated. An I. Q. of 100 obtained from the correct administration of a test would vary 4 or 5 points on the second giving. There are 99 chances in 100 that an I. Q. of 100 would not vary more than 15 points in the administration of two forms of the same test. Radical changes in environment or emotional maladjustments may produce greater variations than those described. Intelligence quotients remain within certain definable limits from year to year, but the limits are broad (5:360-361).

Although I. Q.s are not constant to the exact score received by the child, in any one given test the variability would likely result.

The actual meaning of "intelligence" also seems to be somewhat variable:

There has not been up to the present time any general agreement concerning the meaning of intelligence. It seems to the author that the essence of intelligence is contained in one aspect of Binet's definition. Binet defined intelligence as (1) the ability to take and maintain a given mental set, (2) the capacity to make adaptations for the purpose of attaining the desired end, and (3) the power of self-criticism. The capacity to make adaptations for the purpose of attaining the desired end is at the very heart of the meaning of intelligence and the author believes it is very nearly the meaning espoused by many psychologists (5:372).

If intelligence does mean an adaptation to meet a desired end, it appears that music might aid many students reach some of their desired ends.

As suggested earlier, this study hopes to reach a significant



correlation of the data concerning music students and other students, thereby convincing administrators that music is as important as other required subjects to the education of the "whole child."

Mursell, in his Principles of Musical Education, published as long ago as 1927, writes that:

All the German studies tend to show that there is a very strong probability that outstanding musical gift is accompanied by intelligence well above the average. On general grounds this might be expected; for after all musical intelligence is only one aspect of general intelligence--or better, it is general intelligence operating in the musical medium. Turning to more specific evidence, the studies indicate that if children are classified as musical, half-musical, and non-musical, it is the first group the largest proportion of whose members make satisfactory progress in school. And again, if we take intelligence, either as measured in a testing scale, or in terms of school success, we find musical talent grouping about the upper end of the scale. No mistake could be greater than to suppose that musicianship and stupidity go together. This peculiar fable may have arisen from the defective general education of some musicians, made inevitable by their intense specialization. But every music teacher knows that musicianship cannot be developed in its fullness in any but the receptive and intelligent, though to be sure the stupid, and even the defective, can be taught to build up a repertoire of instrumental or vocal fireworks (8:113-114).

The above mentioned correlation of music students and other students will be evidenced and discussed in Chapter III.

The offering of music in the schools benefits students in several different ways. For some it is a profession and a life work; for some it serves as part of a religious service; for others it is a business or commercial enterprise; but for most it is a form of recreation for use of leisure time. "Music is almost without a peer as a medium for recreation. Its recreational potentialities can never be exhausted" (6:4).

Bands in schools, and at games of various kinds; the movies, and perhaps above all the radio and television have bombarded us with music of some kind daily and continuously. Music has come to occupy

the largest place in our leisure-time activities. Under these conditions the school has no other course than that of introducing its charges to this world of music (5:288).

In addition to these attributes the study of music contributes to the development of the mind and aids in communication between minds. "The art of music is a creation of the mind of man. All its characteristics and organising principals depend upon the action of the mind" (4:100,110).

A major aspect of music is that of appreciation. If a child enjoys music it is likely that he will do well in a music class.

There are two major aspects of measurement concerned with music: (1) the measurement of aptitude or talent, and (2) the measurement of achievement. A third aspect, that of appreciation, is not coordinate with the first two but, for the general population, may be of equal if not superior importance (5:288).

The opportunity of participation tends to provide the opportunity to develop appreciation.

As well as appreciation, music classes provide the possibility of teaching such attributes as aesthetic values, democratic ideas, social conduct, self-confidence, responsibility, and moral and spiritual values. Music Education in the High School states that "participation in music can offer unlimited opportunities for developing desirable social qualities. Man is not born a social being; he needs to learn how to live and work harmoniously with others" (9:10). This same source also states that "music can satisfy the need for belonging to a group and the desire for social acceptance. Performance in music develops a feeling of responsibility for sharing a joyous experience with others" (9:11).

Beethoven once said:

Only art and knowledge raise man to the divine and music is a higher revelation than all wisdom and philosophy. Music verily is the mediator between intellectual and sensuous life (4:54-55).

These benefits are only a few that a child may absorb from his music instruction. The Music Educators' Source Book states, in part, that:

The primary aim of the senior high school music program should be to offer many musical experiences to every student so as to build for continuing growth and expansion of participation and appreciation. The musical experiences offered every child should, of course, include either participation in or frequent listening to the fine high school bands, orchestras, and choirs which for so long have been a matter of great school pride (11:13).

Many objectives, aims, and purposes have been voiced in countless ways as justification for the presentation of music in our schools. For one example, Article I of the Child's Bill of Rights in Music states:

Every child has the right to full and free opportunity to explore and develop his capacities in the field of music in such ways as may bring him happiness and a sense of well being; stimulate his imagination and stir his creative activities; and to make him so responsive that he will cherish and seek to renew the fine feeling induced by music (10:3).

Before children can reap benefits from a subject they should have a desire to learn. The attitude of high school young people toward music is of utmost importance to a successful music program. This may sometimes be called the school music climate. Many students reject or are indifferent toward music for such reasons as parental indifference to music in the home, poor teaching, unfortunate experience or no experience at all with music in the elementary school, or a narrowly conceived curriculum in the high school.

For music to be indispensable to learning and life, it must be more than a shallow passing experience for the student. Increased proficiency increases enjoyment, and competence begets respect for competence. Therefore, quality is not a limiting factor for the individual, but puts within his grasp an otherwise inaccessible treasure store of the world's cultural riches (9:20).

Music in the high school curriculum is generally an elective, and the quantity and quality of students taking such courses depend on several factors, including the school music climate, the interest and desire of the students, enthusiasm and effectiveness of the past and present music teachers, the social implication of the group activity, and scheduling of classes that will allow participation (9:35).

Music has been offered in the schools of most communities for many years, but perhaps we haven't fully realized what a tremendous attraction music has for teenagers. When you find a school subject that has something to offer every pupil in the school, a subject which appeals to young people so strongly that they willingly give up part of their lunch period or after-school hours for extra rehearsals, you have discovered a subject that can exert a powerful influence for good in their lives (12:3-4).

This chapter has attempted to provide a brief summary of literature relating to the value and purposes of music in the high school. The following chapters will attempt to provide substantial facts verifying the inclusion of music education in the curriculum.

Through exhaustive perusal of several libraries, a very limited supply of literature was found relating to this study. Although there were numerous books reviewing values of music, after a few sources were used further books provided only needless repetition.

Regarding relationships of I. Q.s and grades between music students and other students, and the relationship of music students' grades to their I. Q.s, almost no literature was found. Because of

these facts the researcher believed this study would have great significance.

## CHAPTER III

### PROCEDURE OF THE STUDY

The steps in this study were as follows: (1) to attain permission from each school superintendent to review the school's records; (2) to gather data from each school's records; and (3) to compile the data gathered into statistical information.

By letter, a request was made for permission to review the school's records (Appendix B). After receiving permission from the superintendents, each school was visited and the following information recorded:

1. Name of the school.
2. I. Q. score of each high school student.
3. All grades of each high school student for 1958-1959.
4. School year of each student.

The steps listed below were followed in compiling the data gathered:

1. Finding the mean average of all grades and the mean average I. Q. scores of the following groups. This information is shown on Table I.
  - a. All students.
  - b. All music students.
  - c. All students not in music.
  - d. All students in chorus.
  - e. All students in band.

2. Finding the t score of significance for I. Q. and G. P. A. of the following comparison groups. See Table III.
  - a. All students to all music students.
  - b. All students to students not in music.
  - c. All students to band students.
  - d. All students to choral students.
  - e. Students not in music to music students.
  - f. Students not in music to choral students.
  - g. Students not in music to band students.
  - h. Band students to choral students.

A random sampling of 682 students was used to find the above correlations. This included 50 students from each grade level, or a total of 200 students. Of these 200 students only 32 were in the band and/or chorus groups; therefore, to be able to use the t test of significance in which groups compared must be in pairs, the other groups of students were limited to 32 in each. Because of the previous random sampling, only the first 32 students in each group were used. The formula regarding the t test of significance was recommended and explained to the researcher by Dr. Eldon Jacobsen, Professor at Central Washington State College. Dr. Jacobsen believed it the best one for this study in the comparing of groups.

## CHAPTER IV

### FINDINGS AND INTERPRETATION OF DATA GATHERED

Data gathered are divided into three main categories: (1) grades, (2) intelligence quotient scores, and (3) t scores.

Grades. The grades of each student were averaged and the mean average of each group found. Table I shows the mean average of grades for each group of students being compared. Figure 1 gives the mean G. P. A.s in another comparable form.

After the mean grade point average of each group was found, it was necessary to find other information needed later in the comparing of groups by use of the t score. Below is a sample of data gathered, along with part of the formula used in later computations to find the t score of significance. See Appendix A, Data for Experimental Group.

X	X-M	(X-M) <sup>2</sup>
2.875	.37	.13

X = mean average of each student.

M = mean average of a group of students.

X-M = mean average of each student minus the mean average of the group.

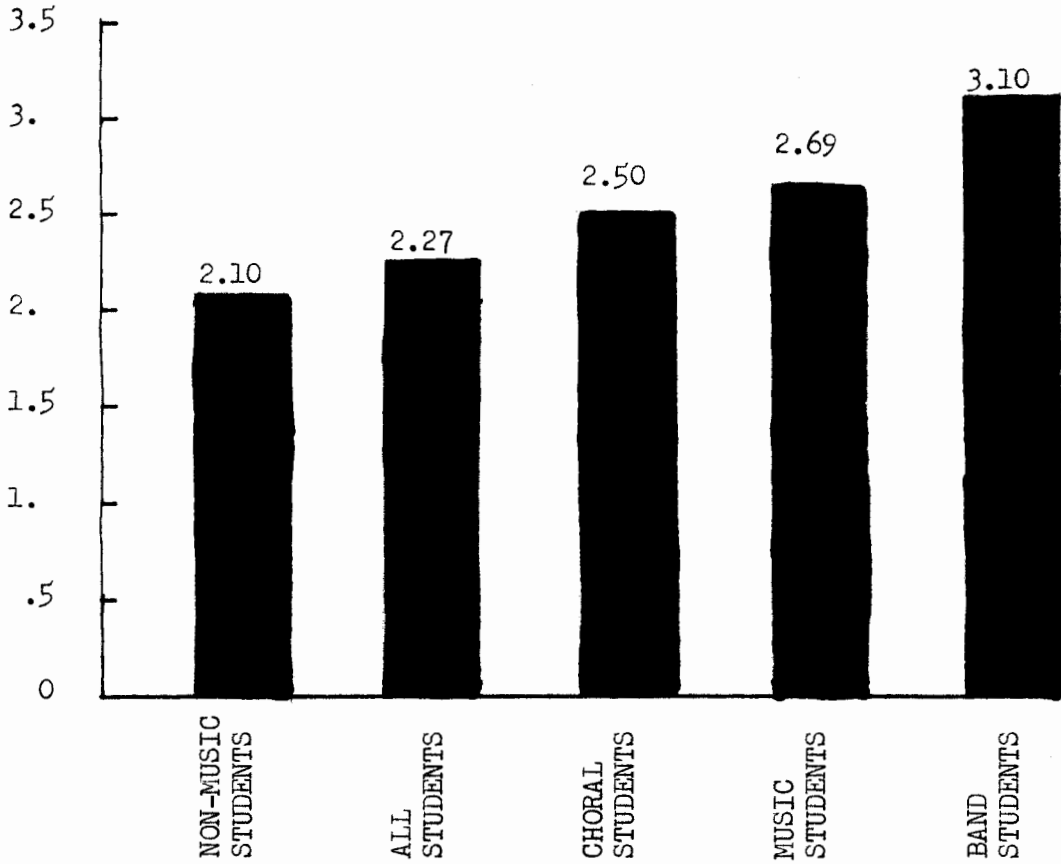
M = 2.50, the answer, for example, in the choral group.

The (X-M)<sup>2</sup> column for each student was added and used in the formula for finding t score. This was done also with the I. Q. score in the same way.



TABLE I  
MEAN INTELLIGENCE QUOTIENT SCORES  
AND GRADE POINT AVERAGES

Group	G. P. A.	I. Q.
All students	2.27	101
Music students	2.69	104
Students not in music	2.10	98
Choral students	2.50	99
Band students	3.10	109



Taken from a random sampling of 682 students.

32 students in each group.

FIGURE 1  
GRADE POINT AVERAGES

The average grades of the various groups are shown on Table I. It should be noted that the lower averages are those of students not in any music course and that the highest are of those in band.

The question arises, were the actual band and choir grades one of the reasons the music students' grade averages were higher than grade averages of students not in music? Band and choral directors may tend to grade higher than other teachers, but to the researcher's knowledge there are no substantial facts on which to base this statement.

Intelligence quotient scores. The I. Q. scores of each student were gathered from the permanent record cards in each school's files. The test used was the Otis Quick-Scoring Mental Maturity Test. From these I. Q. scores the mean average was found for each group. On Table I are the mean averages for I. Q. scores. Figure 2 represents this data in a different form.

The average I. Q. and G. P. A. of the different groups are in Table I. The difference should be noted between choral students and all students in I. Q. and G. P. A. Even though choral students had a lower I. Q. average than all students, the choral students' G. P. A. was higher than that of all students.

t score. After finding the average I. Q.s and G. P. A.s, the following formula was used to find the t score of significance:

$$M = \frac{X}{N} \text{ and } \sigma = \sqrt{\frac{(X-M)^2}{N-1}} \text{ and } \sigma M = \frac{\sigma}{\sqrt{N-1}} \text{ and } \sigma MD = \sqrt{\sigma M_1^2 + \sigma M_2^2}$$

$$\text{and } \underline{t} = \frac{M_1 - M_2}{\sigma MD}$$

M = mean average.

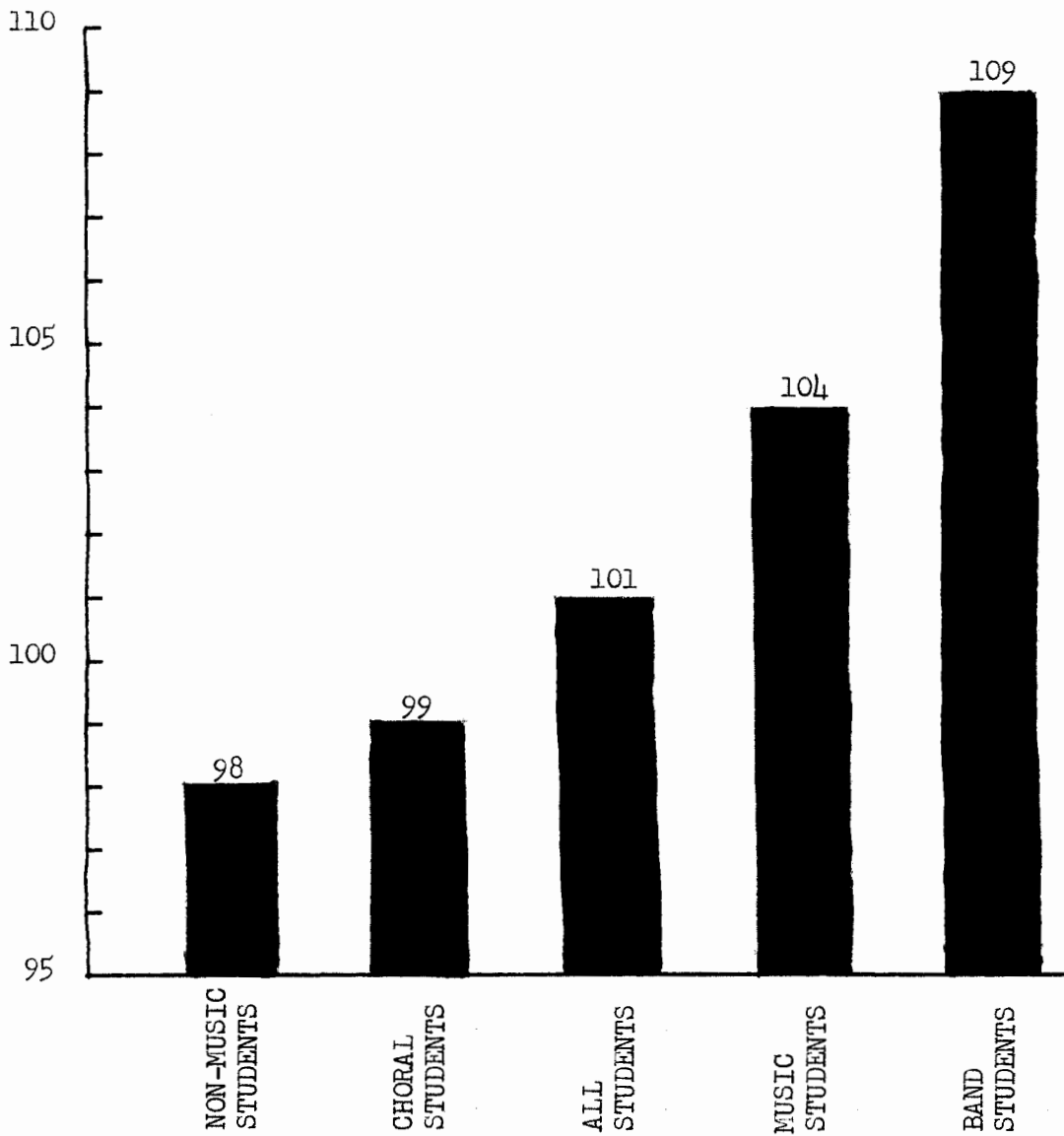
X = total averages of all.

N = number of students in study.

$(X-M)^2$  = each individual average, minus the mean, times itself.

Table II gives a sample of one problem using the above formula.

The findings of  $\underline{t}$  score are on Table III. These findings are a comparison of 32 pairs of students in each group selected by random sampling. A  $\underline{t}$  score of 2.03 or more is necessary for a five per cent level of significance and a  $\underline{t}$  score of 2.73 or more for a one per cent level of significance when comparing pairs of 32 (1:330).



Taken from a random sampling of 682 students.

32 students in each group.

FIGURE 2

INTELLIGENCE QUOTIENT TEST AVERAGES

TABLE II

t SCORE OF SIGNIFICANCE,  
SAMPLE PROBLEM

Band Students' G. P. A.	All Students' G. P. A.
$M = X \div N = 99.49 \div 32$	$M = X \div N = 72.659 \div 32$
$M = 3.10$	$M = 2.27$
$s = \sqrt{\frac{(X-M)^2}{N-1}} = \sqrt{\frac{11.136}{31}} = \sqrt{.359}$	$s = \sqrt{\frac{(X-M)^2}{N-1}} = \sqrt{\frac{27.290}{31}} = \sqrt{.880}$
$s = .599$	$s = .93$
$s_M = \sqrt{N-1} = \sqrt{\frac{.599}{31}} = \frac{.599}{5.56}$	$s_M = \sqrt{N-1} = \sqrt{\frac{.93}{31}} = \frac{.93}{5.56}$
$s_M = .107$	$s_M = .16$
$s_{MD} = \sqrt{s_{M1}^2 + s_{M2}^2} = \sqrt{(.107)^2 + (.16)^2} = \sqrt{.0114 + .0256} = \sqrt{.0370}$	
$s_{MD} = .19$	
$\underline{t} = \frac{M_1 - M_2}{s_{MD}} = \frac{3.10 - 2.27}{.19} = \frac{.73}{.19}$	
$\underline{t} = 3.84$	

TABLE III  
 $t$  SCORE OF SIGNIFICANCE  
 OF GROUPS COMPARED FOR G. P. A. AND I. Q.

Groups compared	G. P. A.	I. Q.
All students to music students	2.33**	.95
All students to students not in music	.77	.86
All students to band students	3.84*	2.72**
All students to choral students	1.27	.65
Choral students to students not in music	2.27**	.32
Music students to students not in music	3.27*	1.86
Band students to students not in music	5.26*	3.67*
Band students to choral students	4.19*	3.96*

\* significant at one per cent level of confidence.

\*\* significant at five per cent level of confidence.

## CHAPTER V

### CONCLUSIONS AND SUMMARY

Many conclusions may be drawn from this study, some significant enough to warrant further study. The primary purpose of this study was to determine whether or not there was any significant difference in academic achievement and intelligence quotient rating between two main groups of high school students: (1) those enrolled in music classes and (2) those not enrolled in music classes. The following paragraphs contain the conclusions reached by the researcher in comparing the various groups in this study. First are the conclusions reached in the comparison of music students with the other groups; second, in the comparison of choral students with the other groups; third, in the comparison of band students with the other groups.

Music students. One of the most valuable parts of this study is the t score comparing music students to other groups. This can be seen on Table III. The I. Q. t score of music students to all students (.95) and music students to students not in music (1.86) was of no significant value, but the G. P. A. t score of the same groups, music students to all students (2.33), is significant above the five per cent level. This shows that music students receive significantly higher average grades than the average grades of all students. In comparing music students to students not in music in G. P. A., the t score of 3.27 is significant at the one per cent level. The one per cent level of significance means



that in a similar study different findings would be due to chance not more than one per cent of the time. Only above a t score of 2.03 is it necessary for a five per cent level of significance and above a t score of 2.73 for a one per cent level of significance when comparing pairs of 32 (1:330).

Choral students. In comparing choral students with students not in music, the mean average I. Q. was 99 and 98 respectively, and the I. Q. t score was only .32, not high enough to be significant. But choral students had a .40 higher mean average G. P. A. than students not in music, and the t score of 2.27 was significant at the five per cent level of confidence. Refer to Tables I and III. This again shows that although students involved in music courses may not necessarily have higher I. Q.s, the average grades they receive are significantly higher. When comparing choral students to all students, the t scores did not show any important difference.

Band students. In this study the band students were found to receive a significantly higher mean average G. P. A. (3.10) than any other group of students. The band students' G. P. A. should have been higher to begin with because the mean average I. Q. (109) was above the mean average of all the other groups compared. See Table I. The G. P. A. t score revealed that the mean G. P. A. for band students compared to the other groups was: Choral students 4.19, all students 3.84, and students not in music 3.27. These three t scores were significant at the one per cent level of confidence. In comparing the

band students in I. Q. t score to the above groups, only two comparisons were significant: Band students to choral students (3.96) and band students to students not in music (3.67). These were significant on the one per cent level of confidence.

Looking at Table III, it can be seen that the band students, even though their I. Q. is higher, received a significantly higher t score in G. P. A.

The I. Q. t score for the comparison group of band students to all students was 2.72, significant at the five per cent level. The G. P. A. t score for the same two groups, band to all students, was 3.84, significant at the one per cent level of confidence. This indicates that the band students are progressing more and receiving higher grades for their I. Q.s than are the other groups of students.

A second purpose of the investigation was to provide administrators further knowledge as to the ability of their students. Evidence to this effect may be seen in Table I. It should be noted that all students (I. Q. 101), students not in music (I. Q. 98), and choral students (I. Q. 99) have approximately the same I. Q. rating. However, these same groups in their grade point averages were significantly different, with choral students receiving the highest G. P. A. of these three groups. This possibly indicates to the administrators that the student with an average I. Q. may be able to do above average work.

Another important finding of this study was the fact that band students had an average I. Q. of 109 and an average G. P. A. of 3.10, both higher than any of the other groups compared. It is believed by

the researcher, therefore, that above average work should be administered to the band student to challenge his capabilities.

A third purpose of this study was to provide the administrators of Okanogan County Schools with valid evidence in support of maintaining music courses in the high school curriculum. The researcher believes that his findings of  $\bar{t}$  score for average I. Q. and average G. P. A. (Table III) provide valid evidence. Here can be seen the fact that the comparison groups, music students to students not in music, had a  $\bar{t}$  score of 1.86 for I. Q., not significant. The G. P. A.  $\bar{t}$  score of 3.27, however, is significant at the one per cent level of confidence. Music students and students not in music have approximately the same I. Q., but music students are receiving a higher average G. P. A. This, perhaps, is due to some influence gained through music classes.

This thesis attempted to prove that music students have either significantly higher I. Q.s and/or G. P. A.s than the other groups of students compared. The researcher believes that these findings indicate that music should have a place in the school curriculum equal to that of other subject areas. Further study including a wider geographical area should be undertaken to substantiate the findings of this study.

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## BIBLIOGRAPHY

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## APPENDIX

APPENDIX A:

DATA FOR EXPERIMENTAL GROUP

ALL STUDENTS

I. Q.				G. P. A.			
<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>	<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>
1	87	16	256	1	1.6	1.01	1.02
2	89	14	196	2	2.75	.14	.01
3	100	3	9	3	2.5	.11	.01
4	109	6	36	4	2.375	.23	.05
5	99	4	16	5	2.1	.51	.26
6	118	15	225	6	3.375	.76	.57
7	140	37	1369	7	3.875	1.26	1.58
8	76	27	729	8	1.00	1.61	2.59
9	104	1	1	9	1.375	1.23	1.51
10	100	3	9	10	1.625	.98	.96
11	113	10	100	11	2.875	.26	.06
12	106	3	9	12	2.625	.01	.0001
13	92	11	121	13	1.444	1.16	1.34
14	84	19	361	14	1.625	.98	.96
15	88	15	225	15	2.375	.23	.05
16	105	2	4	16	1.625	.98	.96
17	85	18	324	17	1.25	1.36	1.84
18	84	19	361	18	.50	2.11	4.45
19	112	9	81	19	2.5	.11	.01
20	92	11	121	20	1.5	1.11	1.23
21	98	5	25	21	1.8	.81	.65
22	89	14	196	22	1.7	.91	.82
23	94	9	81	23	2.3	.31	.09
24	108	5	25	24	3.2	.59	.34
25	113	10	100	25	3.6	.99	.98
26	96	7	49	26	2.4	.21	.04
27	106	3	9	27	3.0	.39	.15
28	110	7	49	28	2.875	.26	.06
29	125	22	484	29	4.	1.39	1.93
30	98	5	25	30	2.09	.52	.27
31	106	3	9	31	1.3	1.31	1.71
32	114	11	121	32	3.5	.89	.79
			<hr/>				<hr/>
	3240		5726		72.659		27.290

NO = Case number of student.

M = 101 for I. Q.

X = Mean average of each student.

M = 2.27 for G. P. A.

M = Mean average of group.

## STUDENTS NOT IN MUSIC

I. Q.				G. P. A.			
<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>	<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>
1	87	15	225	1	1.6	.93	.86
2	89	13	169	2	2.75	.22	.04
3	100	2	4	3	2.5	.63	.0009
4	109	7	49	4	2.375	.15	.02
5	99	3	9	5	2.1	.43	.18
6	118	16	256	6	3.375	.84	.70
7	140	38	1444	7	3.875	1.34	1.79
8	76	26	676	8	1.	1.53	2.34
9	104	2	4	9	1.375	1.15	1.32
10	100	2	4	10	1.625	.90	.81
12	106	4	8	12	3.625	.09	.0081
13	92	10	100	13	1.444	1.09	1.18
14	84	18	324	14	1.625	.90	.81
15	88	14	196	15	2.375	.15	.02
16	105	3	9	16	1.625	.90	.81
17	85	17	289	17	1.25	1.28	1.63
18	84	18	324	18	.5	2.03	4.12
19	112	10	100	19	2.5	.03	.0009
20	92	10	100	20	1.5	1.03	1.06
21	98	4	16	21	1.8	.73	.53
22	89	13	169	22	1.7	.83	.68
23	94	8	64	23	2.3	.23	.05
24	108	6	36	24	3.2	.67	.44
25	113	11	121	25	3.6	1.07	1.14
26	96	6	36	26	2.4	.13	.01
27	106	4	16	27	3.	.49	.24
31	106	4	16	31	1.3	1.23	1.51
32	114	12	144	32	3.5	.97	.94
33	87	15	225	33	1.111	1.41	1.98
34	92	10	100	34	2.	.53	.28
35	91	11	121	35	1.8	.73	.53
36	75	27	729	36	1.666	.86	.73
	3139		6083		67.396		26.759

M = 2.10 for G. P. A.

M = 98 for I. Q.



## ALL MUSIC STUDENTS

I. Q.				G. P. A.			
<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>	<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>
11	113	9	81	11	2.875	.09	.0081
28	110	6	36	28	2.8	.08	.0064
29	125	21	441	29	4.	1.22	1.48
30	98	6	36	30	2.09	.69	.47
41	115	11	121	41	2.9	.12	.01
48	120	16	256	48	3.666	.88	.77
50	107	3	9	50	3.25	.47	.22
51	121	17	289	51	3.1	.32	.10
54	104	0	0	54	2.5	.28	.07
55	110	6	36	55	3.25	.47	.22
56	85	19	361	56	2.125	.65	.42
58	83	21	441	58	2.222	.55	.30
61	90	14	196	61	2.333	.44	.19
66	98	6	36	66	2.9	.12	.01
70	103	1	1	70	3.222	.44	.19
71	99	5	25	71	2.5	.28	.07
76	92	12	144	76	2.2	.58	.33
79	97	7	49	79	2.25	.53	.28
81	114	10	100	81	2.4	.38	.14
83	85	19	361	83	1.722	1.05	1.10
85	115	11	121	85	2.454	.32	.10
86	105	1	1	86	2.583	.19	.03
88	97	7	49	88	2.2	.58	.33
89	97	7	49	89	2.2	.58	.33
94	102	2	4	94	2.833	.05	.0025
95	110	6	36	95	3.181	.40	.16
106	90	14	196	106	2.8	.02	.0004
107	112	8	64	107	3.125	.34	.11
112	95	9	81	112	2.5	.28	.07
113	112	8	64	113	2.8	.08	.0064
114	119	15	225	114	3.	.22	.04
118	109	5	25	118	2.	.78	.60
<hr/>			<hr/>			<hr/>	
	3332		3934		85.981		8.1638

M = 2.69 for G. P. A.

M = 104 for I. Q.

## STUDENTS IN CHORUS

I. Q.				G. P. A.			
<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>	<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>
11	113	14	196	11	2.875	.37	.13
51	121	22	484	51	3.1	.60	.36
54	104	5	25	54	2.5	.0	.0
56	85	14	196	56	2.125	.37	.13
58	83	16	256	58	2.222	.27	.07
61	90	9	81	61	2.333	.16	.02
66	98	1	1	66	2.9	.40	.16
70	103	4	16	70	3.222	.72	.51
71	99	0	0	71	2.5	.0	.0
76	92	7	49	76	2.2	.30	.09
79	97	2	4	79	2.25	.25	.06
81	114	15	225	81	2.4	.10	.01
83	85	14	196	83	1.722	.77	.59
85	115	16	256	85	2.454	.04	.0016
86	105	6	36	86	2.583	.08	.0064
88	97	2	4	88	2.2	.30	.09
89	97	2	4	89	2.2	.30	.09
106	90	9	81	106	2.8	.30	.09
107	112	13	169	107	3.125	.62	.38
133	102	3	7	133	3.	.50	.25
135	92	7	49	135	2.5	.0	.0
137	95	4	16	137	2.	.50	.25
139	89	10	100	139	1.7	.80	.64
140	115	16	256	140	3.818	1.31	1.71
149	97	2	4	149	1.909	.59	.34
152	96	3	9	152	1.666	.83	.68
156	95	4	16	156	2.909	.40	.16
163	106	7	49	163	1.808	.69	.47
171	112	13	169	171	2.181	.31	.09
173	83	16	256	173	2.181	.31	.09
179	94	5	25	179	3.415	.91	.82
185	109	10	100	185	3.25	.75	.56
	3185		3425		80.048		8.8480

M = 2.5 for G. P. A.

M = 99 for I. Q.

## STUDENTS IN BAND

I. Q.				G. P. A.			
<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>	<u>NO.</u>	<u>X</u>	<u>X-M</u>	<u>(X-M)<sup>2</sup></u>
11	113	4	16	11	2.875	.22	.04
28	110	1	1	28	2.8	.30	.09
29	125	14	196	29	4.	.90	.81
30	98	11	121	30	2.9	.20	.04
41	115	6	36	41	2.9	.20	.04
48	120	11	121	48	3.666	.56	.31
50	107	2	4	50	3.25	.15	.02
55	110	1	1	55	3.25	.15	.02
94	102	7	49	94	2.833	.26	.06
95	110	1	1	95	3.181	.08	.0064
112	95	14	196	112	2.5	.60	.36
113	112	3	9	113	2.8	.30	.09
114	119	10	100	114	3.	.10	.01
118	109	0	0	118	2.	1.10	1.21
125	120	11	121	125	2.583	.51	.26
128	112	3	9	128	3.583	.48	.23
130	121	12	144	130	3.833	.73	.53
137	95	14	196	137	2.	1.10	1.21
140	115	6	36	140	3.818	.70	.49
143	120	11	121	143	3.9	.80	.64
146	102	7	49	146	3.222	.12	.01
148	115	6	36	148	3.75	.65	.42
150	108	1	1	150	2.727	.38	.14
157	96	13	169	157	2.818	.28	.07
164	119	10	100	164	3.818	.70	.49
165	84	25	625	165	1.5	1.6	2.56
168	117	8	64	168	3.2	.1	.01
169	112	3	9	169	3.583	.51	.26
177	109	0	0	177	3.75	.65	.42
186	113	4	16	186	3.5	.40	.16
189	110	1	1	189	2.75	.35	.12
200	103	6	36	200	3.2	.1	.01
			<hr/>				<hr/>
	3516		2584		99.490		11.1364

M = 3.10 for G. P. A.

M = 109 for I. Q.

APPENDIX B:

LETTER OF REQUEST

August 7, 1959

Superintendent of Public Schools  
Coulee Dam School District No. 401  
Coulee Dam, Washington

Dear Sir:

As partial fulfillment for my Master's Degree in Education at C. W. C. E., it is my intent to investigate the academic records and general intelligence of students in the high schools of Okanogan County, and to make comparisons between those students in music with the other students.

Will you grant me permission to visit your school and review the grade and I. Q. records of the high school students for the past year? If this meets with your approval, I would like to come to your school between August 22 and September 6, 1959. Please let me know if this will be satisfactory. A self-addressed post card is enclosed for your convenience.

Sincerely,

Wayte Kirchner  
Music Director  
Coulee Dam High School  
Coulee Dam, Washington

We are confident that any information made available will be handled in an objective, scholarly manner by Wayte Kirchner. None of his findings will be published or otherwise circulated without your prior permission.

Dr. Herbert Bird  
Associate Professor of Music  
Central Washington College of Education  
Ellensburg, Washington











Name of the school \_\_\_\_\_.

Name of I. Q. test taken \_\_\_\_\_.

Grades scored:

A = 4

B = 3

C = 2

D = 1

F = 0