1955

Relationship Between Academic Achievement of Vocational Agriculture Students and the Academic Achievement of Non-Vocational Agriculture Students in Brookings High School

Jerome Kleinsasser

RELATIONSHIP BETWEEN ACADEMIC ACHIEVEMENT OF VOCATIONAL AGRICULTURE STUDENTS AND THE ACADEMIC ACHIEVEMENT OF NON-VOCATIONAL AGRICULTURE STUDENTS IN BROOKINGS HIGH SCHOOL

A Problem

Presented to

the Faculty of the South Dakota State College

of Agriculture and Mechanic Arts

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

(Plan B)

---

by

Jerome Kleinsasser

August 1955

ACKNOWLEDGMENT

The writer wishes to express his sincere appreciation to Associate Professor Stanley Sundet, in charge of Agriculture Education, South Dakota State College, Brookings, South Dakota, for his advice, help and cooperation in the writing of this problem. Appreciation is also extended to Superintendent John E. Martin and Principal Lester D. Horrigan, Brookings High School, Brookings, South Dakota, for making information available for this research study.

Jerome Kleinsasser

TABLE OF CONTENTS

TABLES

INTRODUCTION

Statement of the Problem

Pupils come to Brookings high school from many different rural schools in the community. These rural pupils must necessarily compete with pupils graduated from the elementary city school. As vocational agriculture instructor at Brookings high school, the writer is interested in the scholastic achievement of rural boys enrolled in the high school. Is the farm boy successfully adjusting himself to this new educational environment and is he working up to his mental capacity? How do vocational agriculture pupils compare in achievement to pupils not enrolled in agriculture?

When rural pupils enter high school, they are met with definite impediments. The classes are larger and greater competition among pupils in class work is experienced. The average size of class in the rural school in Brookings County is less than two pupils, while the average size of the school enrollment is twelve pupils. In Brookings high school the class enrollment will average one hundred pupils. Each class is divided into sections of approximately twenty-five pupils.

The lack of kindergarten training reduces the rural pupil's formal education period by approximately one-half year. This gives the rural pupil a retarded approach to his elementary training, since many preliminary adaptations are made by

the beginning pupil during the kindergarten year.

The general education of the rural pupil is not enriched to any great extent with additional experiences of band, chorus, industrial arts, physical education, speech and home making. Also, outside activities such as scouting, summer recreation, Red Cross swimming programs and Junior league baseball contribute to a broader educational background for the city boy.

All eighth grade graduates must complete the prescribed course of study. Though their education is basically the same, do these additional experiences raise the coefficient of correlation between ability and achievement of the town boys in high school? This would, of course, be difficult to measure. However, since extra class activities are being encouraged more than before, it is believed that a desirable carry-over exists in the total achievement of pupils.

The Brookings Independent School District has an educational program extending from kindergarten through the twelfth grade. The school is organized on a K-6-2-4 basis, that is, a kindergarten, and elementary school of six grades, the seventh and eighth grades organized as a junior high school, and a senior high school of four grades.

The elementary program includes art, music, and physical education classes. The supervised music program begins with kindergarten and physical education is taught to all pupils above the third grade.

The junior high school pupils have their general education continued with additional experiences in band, chorus, industrial arts and home making.

The senior high school program continues the general education by means of required courses and also provides a variety of elective subjects for the students. The vocational training for boys is limited to agriculture and for girls, to home making and secretarial training.

The Bureau of Field Studies and Surveys,[1] University of Minnesota, rates the educational program in the Brookings schools as very good, although this program is hampered some by the lack of class room space.

Students from Brookings high school rank high scholastically when compared with students from many mid-west high schools. This is indicated by the results of the Iowa Tests of Educational Development. This test is administered to every student at Brookings high school each year.

TABLE I was compiled from the confidential summary report of results on the Iowa Tests of Educational Development for Brookings high school for the period 1948 through 1951.

---

(1) Bureau of Field Studies and Surveys, School Building Survey, Brookings, South Dakota, College of Education, University of Minnesota, March, 1953.

TABLE I

PERCENTILE RANKS OF GRADE AVERAGES
FOR COMPOSITE SCORE ON
IOWA TESTS OF EDUCATIONAL DEVELOPMENT
FOR BROOKINGS HIGH SCHOOL

	PERCENTILE RANK			
YEARS	9th Grade	10th Grade	11th Grade	12th Grade
1948	91	91	89	91
1949	91	85	89	95
1950	94	94	86	92
1951	95	97	98	97
1952	94	91	96	99
1953	96	94	90	98
1954	99	97	96	95

In 1954 the percentile rank for freshman students reads 99. This means that the freshman class average is higher than the averages made in 99 per cent of all schools in the same grade on the same test.

Purpose

In this research problem the writer is attempting to determine the relationship of the achievement of vocational agriculture students to the achievement of non-agriculture students in relation to their mental ability.

The writer is the teacher of vocational agriculture at Brookings high school. Therefore, it is a matter of personal interest and convenience to use students from this school for the study.

The writer intends to answer the following questions:

1. What is the coefficient of correlation between I. Q. scores and scholastic achievement for vocational agriculture students?
2. What is the coefficient of correlation between I. Q. scores and scholastic achievement for students not in agriculture?
3. By using the appropriate test of significance, what is the relationship between coefficients of correlation of vocational agriculture students and non-agriculture students?

REVIEW OF LITERATURE

The writer made a diligent search for data and research related to this study, but very little could be found that closely resembled this problem in purpose. A review of the studies available indicate that other writers have had an interest in comparing pupil achievement in elementary school work, secondary school work and student achievement in college.

Since vocational agriculture is not taught as commonly in the high schools as mathematics, science, English and other subjects, not any of the reviews deal specifically with vocational agriculture students. Therefore, studies cited are not entirely similar to this research problem.

A study dealing with high school achievement of pupils from village elementary schools and rural elementary schools, was conducted by Clem and Hovey.[1]

It involved 193 village and 196 rural pupils in three typical villages in New York State. A total of fifteen subjects, involving the heart of the academic field, was used in the study. Clem and Hovey pointed out that the means for village groups were higher than for the rural groups in three subjects. When the test of significance was applied, no difference of particular significance was found. The authors

---

(1). Clem, Orlie M., and Hovey, Chester W., "Comparative High School Achievement of Pupils From Village Elementary Schools and Rural Elementary Schools," Journal of Educational Research, 30: 285-9, December, 1936.

summarized their research in the following statements:

1. There is little difference in academic high school achievement of pupils who receive their elementary training in village schools and those who receive their elementary training in rural schools.

2. Although difference between means were in general not significant, infrequent means for the village group were higher than for the rural group in all cases except French, Algebra, Biology and Physics.

3. The means for village boys excelled rural boys, except in French, European History, and American History.

4. In general, standard deviations were larger for the village group than for the rural group.

An important item to keep in mind concerning this study is that it was conducted in an area where even in 1910 to 1931, the average rural school, in all probability, was better than the average rural school in the Brookings vicinity today. It does indicate, that when a long-range comparison of rural and village pupils is made, very little difference in achievement is evident.

Mr. Arthur E. Traxler,[1] from the New York City Educational Records Bureau, compared achievement scores and school marks and found in 121 correlations a median of approximately .72 and that all except two of the correlations were statistically significant. Among separate subjects, the median correlations varied from .90 in the intermediate algebra

---

(1). Traxler, Arthur E., "Correlation of Schievement Scores and marks," School Review, Vol. 45; 776-80, December, 1937.

to .58 in biology. The correlations between achievement test scores and school marks tend to be somewhat higher than those reported in most studies of this kind. The use of the test results in marking probably raised the correlation to some extent. Traxler did comment that though the tests administered in this comparison were used some in determining student class marks, the results should not be discounted since teachers in New York City have stated they do not follow the practice of grading their students according to the results of the New York Achievement Test that is given to the pupils.

"Relation Between High School Average Grade and Academic Achievement of Agriculture Students, Agricultural and Mechanics College of Texas," was an interesting study completed by John R. Bertrand.[1] His study concerns students in college. Bertrand studied 637 non-transfer students enrolled as freshmen in agriculture at A & M College of Texas. He found, as a single indicator of scholastic achievement in college, there is little difference between high school average grades and over-all measure of aptitude. However, it was pointed out that this was true primarily in the case of students who had average or higher, high school grades. Those students who needed to be put on probation status at the college because

---

(1). Bertrand, John R., "Relation Between High School Average Grade and Academic Achievement of Agricultural Students, Agricultural and Mechanics College of Texas," College and University, 30: 166-81, January, 1955.

of insufficient grade points, could be more accurately measured for predicting their scholastic achievement by using the aptitude test.

The research by Bertrand was prompted by the fact that many students enroll in college as freshmen with a high school grade record coming from many out-lying small towns. These high school student grades had a great deal of variance, since the standards upon which grades were given were not always known.

It was the purpose in a study by Hass[1] to compare the educational proficiency of the freshman and sophomore pupils in six east central South Dakota high schools who entered from one-room rural schools with pupils who received their elementary schooling in town schools. In making his comparison the mean ages, mean mental ability scores and mean achievement scores were treated for possible significant difference by the use of the "t" score technique. It was found, that as far as age and mental ability of the rural and town school graduates in the six schools were concerned, that no significant difference existed between them at the five per cent level of significance. In the mean achievement scores only three out of the sixty cases treated showed significant

---

(1). Hass, William V., "A Study Comparing the Educational proficiency of The One-Room Rural School Graduates and The Town Elementary School Graduates Found in The Freshman and Sophomore Classes of Six East Central High Schools in South Dakota," Thesis Submitted to Faculty of South Dakota State College, January, 1948.

differences at the five per cent level of significance. Hass pointed out that caution should be exercised in making too definite conclusions on his study since it was limited in scope and that other related studies differed in the final results from those he obtained in schools of South Dakota.

PROCEDURE

The initial step in this study was to ascertain the number of boys that should be included in the investigation. It was decided that all vocational agriculture students enrolled in the school year of 1953-54 and members graduated in the classes of 1952 and 1953 would be included.

The boys in each class in high school were separated into the town boy group and those enrolled in vocational agriculture. Since the numbers were found to be unequal, it was necessary to eliminate some from the list of town boys so that their numbers would equal the number of vocational agriculture students in the class. This was done by dividing the number of agriculture students in each class into the number of town boys, to determine the necessary interval to be used in making each selection. In the case of the freshman class, there were forty-two boys. Seven of them were enrolled in agriculture. The thirty-five boys not in agriculture were divided by seven, making the interval for selecting, every fifth boy. TABLE II reveals the total number of boys in each class and number of boys used in this study.

A total of ninety-six boys were included in this research problem. The pupils in this study were enrolled in Brookings high school for the entire school year from

TABLE II

TOTAL NUMBER OF BOYS IN EACH CLASS,
THE INTERVAL FIGURE USED,
NUMBER OF VOCATIONAL AGRICULTURE AND
NON-AGRICULTURE STUDENTS BY HIGH SCHOOL CLASSES

Number of boys in the classes	Interval Used	Agriculture Students	Non-Agriculture Students
42 Freshman	5	7	7
36 Sophomore	2	12	12
46 Junior	5	7	7
41 Senior	3	9	9
34 Class of 1953	4	7	7
26 Class of 1952	3	6	6

which the school marks were taken. The number assigned is the only identification that each student has in this study.

The achievement is measured by using grade points. The mental ability is measured by I.Q. scores. The grade points and I.Q. scores for the students in this problem were taken from the permanent record file at Brookings high school. For the purpose of this research, letter marks were converted to grade points by assigning numerical values to each letter grade as follows: A-4, B-3, C-2, D-1, and F-0.

The I.Q. scores and grade point values were simplified for use in the Pearson product moment formula by coding the raw score. Coding applies very well to the calculation of r_{xy} because the coded results of the computation do not need to be decoded. Also, the measures of variation, such as standard deviation and range, are uninfluenced by subtraction of a constant from every member in the series. A constant was selected as an arbitrary figure near the mean. Each score in the grade point series was coded by subtracting fifteen, thus giving it the value of X minus 15 or x. The I.Q. scores were coded by subtracting one hundred and thus giving them the value of Y minus 100 or y. Changing from the use of large letters X and Y to small letters x and y indicates that the values have been coded.

In using the product moment formula, the number of students, the sum of the grade points and the sum of the

I. Q. scores are used to determine the coefficient of correlation. This formula is applied to the data for each group in this study.

The coefficient of correlation for each group is subjected to the logarithmic formula in solving for the z value. The X value is determined by using an appropriate formula.

When the X value is entered in the normal probability table, the null hypothesis is either accepted or rejected.

RESULTS OF THE STUDY

The basic findings of this study are presented in this section. The results reveal whether there is a significant difference in the achievement of students enrolled in vocational agriculture in Brookings high school and those boys not enrolled in agriculture. The coefficients of correlation between achievement and mental ability of the agriculture students and between the achievement and mental ability of the non-agriculture students is also revealed.

Two coefficients of correlation are computed in order to indicate what relationship in achievement exists between the two groups. As previously stated, achievement is measured by the use of grade points, and mental ability by the use of I. Q. scores. The coefficient of correlation, .42, between I. Q. scores and grade points for agriculture students is referred to as r_1. The coefficient of correlation, .53, between I. Q. scores and grade points for non-agriculture students is r_2.

The statistical technique used in calculating the coefficient of correlations is the Pearson product-moment formula. The data needed to compute the r value are found on Table III and IV. These tables contain the product of xy and the squares of x and y. The total of each column in the tables is given because the product moment formula requires the summation of x, y, xy, x^2 and y^2. The use of x

and y indicate that we are dealing with coded values.

The product-moment formula in determining the coefficient of correlation is stated as follows:

$$r = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{[N\Sigma x^2 - (\Sigma x)^2][N\Sigma y^2 - (\Sigma y)^2]}}$$

In computing the coefficient of correlation, r_1, for the vocational agriculture student group, the following summations were taken from Table III.

Where
$N = 48$
$x = -7$
$y = 392$
$xy = 672$
$x^2 = 1179$
$y^2 = 5732$

Substituting the appropriate values in the above formula, we get

$$r_1 = \frac{(48)(672) - (-7)(392)}{\sqrt{[(48)(1179) - 1179][(48)(5732) - 5732]}}$$

$= .42$

The coefficient of correlation for students not enrolled in vocational agriculture, r_2, is calculated as follows: (Table IV)

Where
$N = 48$
$x = 235$
$y = 773$
$xy = 5394$
$x^2 = 3017$
$y^2 = 17397$

When the formula for calculating the coefficient of correlation is applied,

$$r_2 = \frac{(48)\,(5394) - (235)\,(773)}{\sqrt{\left[(48)(3017) - 3017\right]\left[(48)(17397) - 17397\right]}}$$

$$= .53$$

Thus .42 and .53 are the two coefficient of correlations determined from two samples of students at Brookings high school.

These correlations deal with achievement in relation to mental ability. The agriculture boys have a lower coefficient of correlation than the boys not in agriculture.

Though there is a difference in the r values of the two groups, this in no way predetermines that a real or statistical difference exists. More definite information pertaining to the existing relationship of r_1 to r_2 can be ascertained when each r value is subjected to a logarithmic formula to derive the z score. The z_1 refers to vocational agriculture students, and z_2 is used for those not in agriculture. The formula used for calculating z is:

$$z = \tfrac{1}{2}\left[\log_e (1+r) - \log_e (1-r)\right]$$

Where $r_1 = .42$

$N_1 = 48$

$$z_1 = \tfrac{1}{2}\left[\log_e (1+.42) - \log_e (1-.42)\right]$$

$$= .4477$$

Where $r_2 = .53$

$N_2 = 48$

$$z_2 = \frac{1}{2}\left[\log_e (1+.53) - \log_e (1-.53)\right]$$

$$= .5934$$

The X value of relationship between r_1 and r_2 is computed by using the z values in the following formula:

$$X = \frac{z_1 - z_2}{\sqrt{\frac{1}{N_1 - 3} \quad \frac{1}{N_2 - 3}}}$$

When $z_1 = .4477$

$z_2 = .5934$

Then,

$$X = \frac{.5934 - .4477}{\sqrt{\frac{1}{48 - 3} \quad \frac{1}{48 - 3}}}$$

$$= .69$$

The X value of relationship between r_1 and r_2 is entered on the normal table (Appendix A).

With a table value of .69 the probability is greater than five per cent that the two correlation coefficients are from the same population. Therefore, there is no significant difference.

TABLE III
VOCATIONAL AGRICULTURE STUDENTS' GRADE POINTS, I.Q. SCORES CODED INTO x AND y VALUES.

Student Number	Grade Points (X)	I.Q. Scores (Y)	x (X-15)	y (Y-100)	xy	x^2	y^2
1	21	108	6	8	48	36	64
2	9	98	-6	-2	12	36	4
3	19	109	4	9	36	16	81
4	11	112	-4	12	-48	16	144
5	19	114	4	14	56	16	196
6	11	98	-4	-2	8	16	4
7	10	109	-5	9	-45	25	81
8	22	115	7	15	105	49	225
9	8	113	-7	13	-91	49	169
10	13	102	-2	2	-4	4	4
11	9	96	-6	-4	24	36	16
12	24	108	9	8	72	81	64
13	11	114	-4	14	-56	16	196
14	10	100	-5	0	0	25	0
15	10	104	-5	4	-20	25	16
16	11	107	-4	7	-28	16	49
17	18	114	3	14	42	9	196
18	8	100	-7	0	0	49	0
19	18	117	3	17	51	9	289
20	13	102	-2	2	-4	4	4
21	16	104	1	4	4	1	16
22	9	95	-6	-5	30	36	25
23	17	105	2	5	10	4	25
24	10	105	-5	5	-25	25	25
25	18	103	3	3	9	9	9
26	19	102	4	2	8	16	4
27	10	116	-5	16	-80	25	256
28	11	124	-4	24	-96	16	576
29	14	104	-1	4	-4	1	16
30	11	117	-4	17	-68	16	289
31	16	99	1	-1	-1	1	1
32	10	106	-5	6	-30	25	36
33	19	108	4	8	32	16	64
34	10	101	-5	1	-5	25	1
35	19	122	4	22	88	16	484
36	20	123	5	23	115	25	529
37	18	111	3	11	33	9	121
38	15	112	0	12	0	0	144
39	24	116	9	16	144	81	256
40	12	98	-3	-2	6	9	4
41	22	112	7	12	84	49	144
42	12	97	-3	-3	9	9	9
43	12	111	-3	11	-33	9	121
44	26	115	11	15	165	121	225
45	13	112	-2	12	-24	4	144
46	12	109	-3	9	-27	9	81
47	20	110	5	10	50	25	100
48	23	115	8	15	120	64	225
48	713	5192	-7	392	672	1179	5732

N = 48
$\Sigma X = 713$
$\Sigma Y = 5192$
$\Sigma x = -7$
$\Sigma y = 392$
$\Sigma xy = 672$
$\Sigma x^2 = 1179$
$\Sigma y^2 = 5732$

TABLE IV
NON-AGRICULTURE STUDENTS' GRADE POINTS, I.Q. SCORES CODED INTO x AND y VALUES.

Student Number	Grade Points (X)	I.Q. Scores (Y)	x (X-15)	y (Y-100)	xy	x^2	y^2
1	18	117	3	17	51	9	289
2	9	111	-6	11	-66	36	121
3	23	118	8	18	144	64	324
4	17	113	2	13	26	4	169
5	22	112	7	12	84	49	144
6	12	97	-3	-3	9	9	9
7	28	133	13	33	429	169	1089
8	16	105	1	5	5	1	25
9	28	119	13	19	247	169	361
10	17	128	2	28	56	4	784
11	25	108	10	8	80	100	64
12	11	104	-4	4	-16	16	16
13	29	108	14	8	112	196	64
14	17	105	2	5	10	4	25
15	15	110	0	10	0	0	100
16	14	102	-1	2	-2	1	4
17	22	116	7	16	112	49	256
18	11	97	-4	-3	12	16	9
19	28	122	13	22	286	169	484
20	16	110	1	10	10	1	100
21	31	122	16	22	352	256	484
22	15	108	0	8	0	0	64
23	21	127	6	27	162	36	729
24	25	116	10	16	160	100	256
25	13	105	-2	5	-10	4	25
26	15	119	0	19	0	0	361
27	15	128	0	28	0	0	784
28	19	115	4	15	60	16	225
29	16	121	1	21	21	1	441
30	28	118	13	18	234	169	324
31	26	135	11	35	385	121	1225
32	13	106	-2	6	-12	4	36
33	21	127	6	27	162	36	729
34	22	116	7	16	112	49	256
35	20	124	5	24	120	25	576
36	28	108	13	8	104	169	64
37	32	125	17	25	425	289	625
38	26	131	11	31	341	121	961
39	18	115	3	15	45	9	225
40	25	110	10	10	100	100	100
41	13	107	-2	7	-14	4	49
42	32	141	17	41	697	289	1681
43	13	121	-2	21	-42	4	441
44	20	125	5	25	125	25	625
45	19	105	4	5	20	16	25
46	13	124	-2	24	-48	4	576
47	25	132	10	32	320	100	1024
48	13	107	-2	7	-14	4	49
48	955	5573	235	773	5394	3017	17397

$N = 48$ $\quad \Sigma x = 235$ $\quad \Sigma x^2 = 3017$
$\Sigma X = 955$ $\quad \Sigma y = 773$ $\quad \Sigma y^2 = 17397$
$\Sigma Y = 5573$ $\quad \Sigma xy = 5394$

SUMMARY AND CONCLUSION

The primary purpose of this study was to determine whether a significant difference exists in the achievement between vocational agriculture students and non-agriculture students of Brookings high school.

The sample taken from the population for use in this research were students enrolled in Brookings high school during the school year of 1953-54 and senior class members graduated in 1952 and 1953.

The measure of mental ability used was the I. Q. score, and the measure of achievement was the teachers' marks. Both were taken from the permanent record files at Brookings high school.

A coefficient of correlation was computed by using the Pearson product moment formula. All raw I.Q. and grade point scores were coded as shown in Table III and IV, to simplify the computations. Then a correlation was made between I.Q. scores and grade points for agriculture students, and another was calculated for non-agriculture students. The resulting coefficients of correlation were .42 and .53, respectively.

The formula used to compute the z score was the one suggested by Johnson.[1] The z_1 score of .4477 and z_2 score of .5934 were used in another formula to derive the X value of relationship. The X value of .69 was entered on the normal

---

(1). Johnson, Palmer D., Statistical Methods of Research, New York, Prentice-Hall, Inc., 1949, p. 87.

table (Appendix A). This determined that the two groups of students sampled at Brookings high school are from the same population.

The conclusions of this study are limited to some extent by the following factors:

1. The sample used in the study was small; therefore the conclusions drawn for the study relate primarily to a limited population.
2. A long-range comparison of achievement between students of vocational agriculture and those not in agriculture would be more reliable.

In view of the limitations mentioned and the usual hazards of making generalizations, the following conclusions are drawn from this study.

1. The coefficient of correlation between I.Q. scores and scholastic achievement for vocational agriculture students was .42.
2. The coefficient of correlation between I.Q. scores and scholastic achievement for students not in vocational agriculture was .53.
3. With a table value of .69 the probability is greater than five per cent that the two coefficients of correlation, r_1 and r_2, are from the same population. Therefore, there is no significant difference.

BIBLIOGRAPHY

Bertrand, J. R., "Relation Between High School Average Grade and Academic Achievement of Agriculture Students, Agricultural and Mechanic College of Texas," College and University, XXX, (January, 1955) 166-181.

Clem, Orlie M., and Hovey, Chester W., "Comparative High School Achievement of Pupils from Village Elementary School and Rural Elementary Schools," Journal of Educational Research, XXX, (December, 1936), 285-289.

Edwards, Allen L., Statistical Analysis for Students in Psychology and Education, New York, Rinehart & Company, Inc., 1946.

Hass, William V., "A Study Comparing the Educational Proficiency of the One-Room Rural School Graduates and the Town Elementary School Graduates Found in the Freshman and Sophomore Classes of Six East Central High Schools in South Dakota", Thesis Submitted to Faculty of South Dakota State College, (January, 1948).

Johnson, Palmer O., Statistical Methods of Research, New York, Prentice-Hall, Inc., 1949, 52-53, 87.

Traxler, Arthur E., "Correlations of Achievement Scores and Marks", School Review, XLV, (December, 1937), 776-780.

APPENDICES

APPENDIX A

NORMAL TABLE OF DISTRIBUTION

PROBABILITY	TABLE VALUE
.9	.126
.8	.253
.7	.385
.6	.524
.5	.674
.4	.842
.3	1.036
.2	1.282
.1	1.645
.05	1.960
.02	2.326
.01	2.576
.001	3.291

APPENDIX B

VOCATIONAL AGRICULTURE STUDENTS'

Student Number (N)	Grade Points (X)	I.Q. Scores (Y)
1	21	108
2	9	98
3	19	109
4	11	112
5	19	114
6	11	98
7	10	109
8	22	115
9	8	113
10	13	102
11	9	96
12	24	108
13	11	114
14	10	100
15	10	104
16	11	107
17	18	114
18	8	100
19	18	117
20	13	102
21	16	104
22	9	95
23	17	105
24	10	105
25	18	103
26	19	102
27	10	116
28	11	124
29	14	104
30	11	117
31	16	99
32	10	106
33	19	108
34	10	101
35	19	122
36	20	123
37	18	111
38	15	112
39	24	116
40	12	98
41	22	112
42	12	97
43	12	111
44	26	115
45	13	112
46	12	109
47	20	110
48	23	115
48	713	5192

$N = 48$

$\Sigma X = 713$

$\Sigma Y = 5192$

APPENDIX C

STUDENTS NOT IN VOCATIONAL AGRICULTURE

Student Number (N)	Grade Points (X)	I.Q. Scores (Y)
1	18	117
2	9	111
3	23	118
4	17	113
5	22	112
6	12	97
7	28	133
8	16	105
9	28	119
10	17	128
11	25	108
12	11	104
13	29	108
14	17	105
15	15	110
16	14	102
17	22	116
18	11	97
19	28	122
20	16	110
21	31	122
22	15	108
23	21	127
24	25	116
25	13	105
26	15	119
27	15	128
28	19	115
29	16	121
30	28	118
31	26	135
32	13	106
33	21	127
34	22	116
35	20	124
36	28	108
37	32	125
38	26	131
39	18	115
40	25	110
41	13	107
42	32	141
43	13	121
44	20	125
45	19	105
46	13	124
47	25	132
48	13	107
48	955	5573

$N = 48$

$\Sigma X = 955$

$\Sigma Y = 5573$