# RELATIONSHIP BETWEEN TRAINING IN VOCATIONAL AGRICULTURE AND SUCCESS IN SELECTED COURSES IN FOUR AGRICULTURAL CURRICULUMS AT KANSAS STATE UNIVERSITY

by

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# INTRODUCTION

There has been much controversy as to the relative effect of certain variables upon the success of students in the school of Agriculture at Kansas State University. Previous studies at Kansas State University and other institutions have been made on the performance of students at the end of their freshman year (2)(11)(14). Others have compared the performance of students on the basis of total grade point average upon graduation (4) (12)(16). In talking with Director Wilson of the School of Agriculture and other departmental personnel it was decided that a comparison should be made on the performance of students in a few selected courses at Kansas State University. Thus a more exact inference could be made as to the effect of the variables studied.

The purpose of this study was to determine what effect certain variables had upon the success of students enrolled in the curriculums of Agricultural Education, Agricultural Economics, Animal Husbandry and Agronomy, in the School of Agriculture at Kansas State University. The problem was considered whether to include such variables as high school rank, veteran or non veteran, married or single, and fraternity or non fraternity. Upon review of previous studies concerning these variables at Kansas State University it was found by Hoyt (7)(8) and Geffert (6) that the correlations between these variables and success in college had been thoroughly investigated.

The problem then, became one of analyzing certain traits correlated with the success of students in the school of agriculture in courses in which nearly all students enroll. The purpose of such a study at Kansas State University was to reveal the need for a change in college preparatory courses or curriculum changes to cope with agriculture's change in technology.

## MATERIAL AND METHODS

The material for this study was obtained from the records of the office of the dean of the school of Agriculture, the office of Admissions, the Counseling office and the Education office. These offices are on the campus of Kansas State University.

This study included students who were enrolled in the curriculums Agricultural Education, Agricultural Economics, Animal Husbandry and Agronomy. Selection was made from those who graduated in either January, June or August of the years 1955, 1956, 1957, and 1958.

The total number of students compared was not equal for all the courses studied. This is because substitutions were made in some cases for one or more of the courses normally taken by students of agriculture or curriculum changes no longer required a particular course for graduation.

Certain criterion for the selection of data was decided upon at the beginning of the study in Conference with Director Wilson and other staff members.

Before students were eligible to be considered as a part of the study they must have been graduated from a Kansas high school, begun and completed their college education at Kansas State University, remained in the same curriculum the entire time and completed their college education within eight semesters and one summer session.

The data were analyzed by comparing the success of students in selected courses in college with ACE scores, whether or not they had vocational agriculture in high school, total grade point average in the courses compared and the different grades obtained in these courses among curriculums.

Fourteen courses were used to compare the performance of students. These were Written Communications I, Written Communications II, General Geology, Elements of Animal Husbandry Lecture, Elements of Animal Husbandry Laboratory, Elements of Dairying, Farm Poultry Production Lecture, Farm Poultry Production Laboratory, Organic Chemistry, Agricultural Journalism, Economics I, Soils, Farm Crops and Principles of Feeds and Feeding. These 14 courses, 38 credit hours, were chosen because they were all common to the four curriculums included in this study.

A total list of 278 students, who had graduated in the years 1955 to 1958 inclusively, was obtained from records of the dean's office. Of these only 234 met the requirements to be included in the study. The remaining 44 were dropped because their permanent records revealed they were transfer students or they had failed to graduate within eight semesters and one summer session.

Permanent records kept by the office of Admissions provided information concerning high school vocational agriculture. Grades received by each of the 234 students in the 14 selected courses were also obtained from the student's permanent records.

The counseling office provided ACE scores made by each student upon entering Kansas State University. Statistical treatment of the data was limited to simple statistical calculations. The H-test, Chi-square and analysis of variance were the primary methods used. It was necessary to use a ranking procedure in order to analyze the data in tabular form properly. To calculate rank the number of A's, B's, C's, D's, and F's were totaled for the four curriculums in each course. The total number of (A's/2) plus $\frac{1}{2}$ gave the weight (W) to be used for each curriculum. The total number of (B's/2) plus $\frac{1}{2}$ plus the total number of A's gave the W for the B's. The total number of (C's/2) plus $\frac{1}{2}$ plus the total number of A's and B's gave the W for the C's etc. until a (W) was assigned to each letter grade. The frequency (F) of each letter grade times its weight (W) gave the rank (R) for each of the letter grades. Each of the four rank totals ( R) were of importance here since they were used to test significance between the four curriculums.

The correctness of the data in tables 1 through 14 (appendix A) was checked by the calculation $\Sigma$rank (R) equals $\frac{1}{2}$ N(N+1). (9)

In testing the significance of the tabular data the H test (9) was employed.

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

Since there were ties, that is, duplication of letter grades, each observation was given the mean of the ranks for which it was tied. Thus, it was necessary to divide by $1-\Sigma T/(N^3-N)$ where the summation was over all groups of ties and T was equal to $t^3-t$ for each group of ties, t being the number of tied observations in the group. By using the H test the Chi-square table could be read to determine significance.

To determine the effect of whether or not students offered vocational agriculture as entrance credit the data were analyzed statistically by the use of the Chi-square ($X^2$) test. $X^2$ equals $\Sigma\frac{(O-E)^2}{E}$, where O is the observed frequency and E is the expected frequency.

The rejection level for all the statistical tests was set at .05. This means that 95 percent of the time, on the average, a type-I error would be avoided. The type one error occurs when the null hypothesis ("no difference among effects") is true, but is rejected as a result of the test.

## REVIEW OF LITERATURE

Many studies have been conducted at other institutions in an attempt to predict the success of students enrolled in the school of agriculture. One such study has been completed prior to this study at Kansas State University. Such studies have occasionally indicated trends toward a need for changes in college preparatory courses or necessary curriculum changes to cope with agriculture's change in technology.

Bicknell (2) in 1947 studied the records of 337 freshman agriculture students who entered Iowa State College in the fall quarter of 1946. These students were divided into two groups, those who had taken vocational agriculture in high school and those who had not. As a control factor, the American Council of Education Psychological Examination was used along with high school grade point averages. The grade point average of each group was compared at the close of the spring quarter. Allowance was made for military service by stratifying into veteran and non-veteran groups.

Where high school grades were used as a means of prediction, the vocational agriculture students made, on the average, one twentieth of a letter grade better than was expected of them. The students who did not have vocational agriculture averaged one twenty-fifth of a letter grade better than was expected of them.

When using both high school grades and the American Council of Education Psychological Examination scores for prediction, the students who had had vocational agriculture averaged one-eighth of a letter grade better than was predicted and the students who had not studied vocational agriculture in high school averaged one-eleventh of a letter grade lower than was predicted for them.

It was concluded from the study that there are some factors other than college aptitude, as measured by the American Council of Educational Psychological Examination, and high school grades, which tend to make former vocational agricultural high school

students more successful than other students in courses taken by freshmen in the division of agriculture at Iowa State College.

Moss (12) in 1947 made a study at Texas Technological College to determine the value of vocational agriculture in high school as preparation for work in the divisions of agriculture.

He studied the records of 200 graduates of the agricultural division of the Texas Technological College. One hundred boys who had credit in vocational agriculture in high school were compared to 100 boys who did not present vocational agriculture as entrance credit. The records were taken from the files in alphabetical order and included the first 100 who had taken vocational agriculture in high school.

All agriculture subjects for each student were grouped into freshman, sophomore, junior and senior classification. The average marks for each classification were then computed. All of the agricultural course marks were converted to their corresponding numerical values and averaged together to give the average marks made by each student in his entire college curriculum. Also, the total number of college grade points were divided by the total number of credit hours to give the grade point average which was used as a basis for comparing the two groups on all their college work.

From the results he concluded that students who had had vocational agriculture in high school did better in college work after the freshman year than did students in similar courses who had not had vocational agriculture in high school.

He further concluded that there was no significant difference between the two groups on their total grade point average for all college works.

Bell (1) in 1953 investigated the achievement of 417 students who had completed two years of work in the school of agriculture by the spring of 1953. Scholastic attainment of the students having vocational agriculture background was compared to those who had no vocational agriculture background.

He found that students who have vocational agriculture in high school do consistantly better work in those courses which are directly related to agriculture than those students who did not take vocational agriculture in high school. Both groups were found to be weak in English, History and Mathematics. The study also showed that there were nine percent fewer dropouts among the students who had vocational agriculture than among those who had not had vocational agriculture.

Wiggins (16) in 1953 conducted a study to determine whether a boy planning to study agriculture in one of the four year courses at Pennsylvania State College should study vocational agriculture in high school.

Using a sampling technique, data on 93 male graduates from the school of agriculture in years 1941 through 1952 were gathered. The data consisted of high school subjects completed, rank in high school class, the college curriculum entered and graduated from, college honor point average and rank in college class. The samples were stratified according to the number of years of high school vocational agriculture and according to the

number of years of high school science and mathematics completed. Using high school and college records as a basis, comparisons of college success were made, as measured by honor point averages.

He found that there was no significant differences in the college honor-point average of the groups studied. The study of Chemistry, Physics, Algebra, Geometry, or Biology in high school had no measurable effect upon the college honor-point average of those who studied four years of vocational agriculture in high school. The study also revealed that students who ranked higher in high school grades also tend to rank higher in college. It was concluded in this study that high school rank seemed to be the factor upon which a more reliable prediction of college success could be made rather than upon curriculum studied.

Luster (11), at Ohio State University, compared the grades and scores on college entrance tests of 430 college freshman who entered the college of agriculture in the autumn of 1953. Forty percent of the total were former high school vocational agriculture students.

The former vocational agriculture students made slightly lower scores on the Ohio State Psychological Examination and on the English placement test, but scored higher than the other group on the mathematics entrance test. Other comparisons made showed that the former vocational agriculture students made slightly higher overall grades in all college courses and higher grades in agriculture and mathematics courses than the other

group. However, they showed less achievement in English and Chemistry. Freshman who ranked in the upper one-third of their high school class made superior grades in college by eight-tenths of a grade point than those in the lower two-thirds of their class.

Long (10), in 1958, conducted a study at Oregon State College to determine whether students with a high school vocational agriculture background were as qualified to do college work in the School of Engineering at Oregon State College as those students who had no background of vocational agriculture. Data were gathered on 90 students who had completed at least three terms in the school of Engineering and who had offered vocational agriculture as entrance credit during the years 1951 through 1956. Using the high school decile ranking and the decile scores received on the American Council of Education Psychological Examination as controls, the cumulative grade point average of the 90 vocational agricultural students was compared to the grade point average for all freshman students in the school of engineering. He found that the main grade point average for the vocational agricultural students studied was 2.57 and for the all freshman engineering group 2.36, a difference of 0.21 of a grade point between the two groups.

Bruch (3), in 1957, compared the training in vocational agriculture in high school to grades earned by college students at the University of Missouri. Comparisons were made in the courses Farm Shop 10, Animal Husbandry I, Dairy Husbandry I, Field Crops I, Poultry Husbandry I, Botany I, and Zoology I.

Of the 1016 studied, 649 or 63.9 percent had one or more years of vocational agriculture in high school. Twelve and four-tenths percent of the students with one or more units of vocational agriculture in high school earned a grade of A in the five basic courses in technical agriculture, contrasted to four and seven-tenths percent of the students without background in vocational agriculture. The contrasts involving the two respective groups in grades other than A were: B- 30.5 to 23.9, C- 49.9 to 59.3, D- 5.7 to 9.2, F- 1.3 to 2.5. The contrast was less marked for Poultry I than for the other four courses in technical agriculture.

He concluded that these data indicated that students who present one or more units of entrance credits in vocational agriculture, consistantly earned better grades in designated basic courses in the College of Agriculture at the University of Missouri than students without vocational agriculture. A background of vocational agriculture however, has little bearing upon grades earned in basic courses in Botany.

Circle (4) in 1957, determined whether taking vocational agriculture in high school affected the student's ability to do college level work in agriculture at Kansas State University. He compared the grade point averages of 185 students upon graduation from college. The students were divided into three groups on the basis of vocational agriculture completed in high school. The first group had completed 5 to 7 units of agriculture, the second group one to four units and the third group had no vocational agriculture.

He concluded that as the amount of vocational agriculture was reduced the mean grade point upon graduation from college in agriculture was reduced. Vocational agriculture and science taken in combination resulted in the highest mean grade point, but vocational agriculture was more helpful than science for college preparation as measured by mean grade points upon graduation from college in agriculture.

Pederson (14) of Oregon State College in 1959, made a study to determine if there was any difference in the scholastic performance at the end of the freshman year in the school of agriculture between former students of vocational agriculture and those who did not take agriculture in high school. The grade-point average at the end of the freshman year was used to measure scholastic performance, and the American Council of Education Psychological Examination and the high school decile were used as measures of intelligence and ability.

He concluded that students who offered two or more units of vocational agriculture as entrance credit to the school of Agriculture at Oregon State College were not penalized in their first year college performance. Also that students who offered no vocational agriculture as entrance credit had no advantage in their scholastic performances the first year as measured by grade point averages.

Nielson (13), graduate students and staff members in agricultural education at Iowa State College did studies on an Agricultural Experiment Station Project designed to determine the relationship of high school vocational agriculture

to the subsequent establishment of graduates in farming and other occupations. High schools in Iowa which offered vocational agriculture during at least eleven of the twelve years from 1943 through 1954 were paired with schools which had not offered vocational agriculture during the same period. Pairings were made on the basis of school location, population of the town, religious preference and nationality of the people, high school enrollment, level of living index, and predominating soil type. Twenty pairs of schools were drawn at random from the possible pairings to make up the forty schools which were included in the project.

The vocational agriculture graduates included in the samples used for various phases of the project were selected from the total of 1,545 graduates of the 20 vocational agriculture schools, during the years 1943-1954 inclusive, who had completed three or more years of vocational agriculture. All of these men were living on farms when graduated. The high school graduates used who did not receive vocational agriculture training, were selected from the total of 1,328 graduates of the 20 schools which did not offer vocational agriculture. The 1,328 men were all graduated during the years 1943-1954 inclusive, and were living on farms when graduated.

To study the relationship of high school vocational agriculture to establishment of graduates in farming a random sample of graduates, who were farming in 1955, was drawn from the twenty pairs of schools, after the graduates had been paired as to time of graduation, size of farm of parents at time of graduation and farm ownership status of parents. Eight pairs of

graduates were drawn from each of the twenty pairs of schools. Consequently, a total of 320 farmers were included in the sample, 160 graduates of schools which did not offer vocational agriculture. Each of the 320 farmers was personally interviewed on his farm and the data were tabulated and statistically treated.

To study the relationship of high school vocational agriculture to establishment of graduates in occupations other than farming a new sample of 320 farm-reared male high school graduates was drawn from the original 20 pairs of schools. One hundred and sixty graduates were selected randomly from the 20 vocational agriculture schools and 160 graduates were selected randomly from the 20 schools which did not offer vocational agriculture. All of the graduates selected were in occupations other than farming, and were not college students or college graduates. Questionnaires were mailed to the graduates to obtain the data. Three measures were used to study the 1958 occupational status of the graduates. They were: expressed degree of satisfaction with the occupation, annual earned income from the occupation, and the score of each graduate's occupation on the North-Hatt Scale of occupational prestige.

His findings were that fifty-five per cent of the men who were graduated between 1943 and 1948, and who had completed three or more years of vocational agriculture, were farming in 1958. Twelve per cent of the graduates were in occupations related to farming and 33 per cent were in occupations not related to farming.

High school graduates, who completed three or more years of vocational agriculture, had a significant advantage over high school graduates without such training in the following categories:

| Areas of Investigation | Graduates | |
|---|---|---|
| | With Vocational Agriculture | Without Vocational Agriculture |
| a. Acres of land farmed independently at time of graduation..... | 10% farming some land | 6% farming some land |
| b. Farming status (hired hand, renter, owner, etc.) the first full year of farming after graduation..... | 48% above hired hand status | 31% above hired hand status |
| c. Farming status in 1955..... | 89% above hired hand status | 79% above hired hand status |
| d. Total acres farmed in 1955..... | 57% farmed 161 acres or more | 48% farmed 161 acres or more |
| e. Crop acres farmed in 1955..... | mean of 180 acres | mean of 180 acres |
| f. Acres of corn in 1955..... | mean of 78 acres | mean of 56 acres |
| g. Acres of oats in 1955..... | mean of 39 acres | mean of 30 acres |
| h. Acres of legumes for hay in 1955... | mean of 24 acres | mean of 18 acres |
| i. Acres of rotation pasture in 1955.. | mean of 16 acres | mean of 9 acres |
| j. Hogs sold for slaughter in 1955.... | mean of 132 hogs | mean of 117 hogs |
| k. Mean number of pigs weaned per litter in 1955..... | mean of 7.39 pigs | mean of 6.93 pigs |
| l. Beef cows on farms January 1, 1955..... | mean of 5.9 cows | mean of 3.6 cows |

| Areas of Investigation | Graduates | |
|---|---|---|
| | With Vocational Agriculture | Without Vocational Agriculture |
| m. Fat cattle sold in 1955..... | mean of 18.8 head | mean of 14.5 head |
| n. Dollars livestock gross products from farms in 1955..... | mean of $3055 | mean of $2053 |
| o. Dollars crop gross products from farms in 1955..... | mean of $4668 | mean of $3775 |
| p. Dollars total gross products from farms in 1955..... | mean of $7720 | mean of $5788 |
| q. Extent of use of 24 improved production and management practices, 1943-1955..... | mean index of use 72.4 | mean index of use 66.0 |
| r. Rate of establishment in farming. (Total increase in gross products each additional year they farmed).. | $532 yearly increase | $357 yearly increase |

Farm operators, without regard for type of training, who lived on larger home farms and were graduated from high school, farmed significantly larger farms when interviewed. These also farmed more crop acres and had significantly higher crop and total gross products from their farms than high school graduates who lived on smaller home farms when graduated.

Farm operators who were sons of landowners had a significant advantage over sons of nonlandowners, in crop, livestock, and total gross products.

No significant differences were found between veteran and non-veteran graduates, with regard to dollars, livestock, crop or total gross products.

Graduates with vocational agricultural training were as successful in occupations, other than farming, as graduates without vocational agricultural training when measured by the three criteria employed. (1) The graduates with vocational agriculture scored higher than the graduates without vocational agriculture in all three criteria, but the differences were not statistically significant. The mean annual occupational income for graduates with vocational agriculture was $4,645, as compared to $4,420 for the graduates without vocational agriculture. (2) Comparable nonsignificant variations were observed when the graduates who were not farming were classified by occupations related to farming and occupations not related to farming. (3) Significant, positive correlations were found between annual earned income from the occupation and the prestige score of the occupation, between income and satisfaction with the occupation, and between prestige and satisfaction.

He concluded that vocational agriculture graduates entering farming enjoy a significant advantage over graduates without this education, and suggests that careful analyses need to be made of the contribution vocational agriculture is making to the success of graduates entering occupations other than farming. Only 12 per cent of the vocational agriculture graduates who were not farming, and had not attended college, were in occupations related to farming. Vocational Agriculture should provide information about related occupations, and should offer training in farming which is beneficial to those who may enter related occupations, but should not attempt to specifically train for

proficiency in those non-farm occupations. Specific training for proficiency in the related occupations is a comprehensive area of vocational preparation in itself, embracing many facets of general and technical training.

## RESULTS AND DISCUSSION

In analyzing the material collected for this study it was appropriate to consider how the students compared on the basis of ACE (American Council of Education Examination) scores upon entering Kansas State University. An ACE score has in recent years been obtained on every student entering Kansas State University and has been considered valid in predicting academic success of such students. The comparison between students in the curriculums included in this study was made by performing an analysis of variance on the mean ACE scores for the students in each curriculum. Such scores for each individual student were recorded in the counseling office on the university campus.

Table 1. Analysis of variance of the ACE scores of students upon entering Kansas State University.

| Source of variation | D/F | M S | F | Significance |
|---|---|---|---|---|
| Curriculum | 3 | 1930.83 | 2.60 | .05 |
| Within | 174 | 742.10 | | |
| Total | 177 | | | |

The data included in Table 1 when analyzed for variance showed an F value of 2.60 which when evaluated on an F table was significant at the .05 level. This means that there was a

significant difference in the mean ACE scores of students upon entering their respective curriculums. Since there was a difference a more complete analysis was done in order to detect where these differences existed among the students enrolled in the curriculums included in this study.

Table 2. Mean ACE scores by curriculum for students entering Kansas State University.

| | Curriculum[1] | | | |
|---|---|---|---|---|
| | III : | II : | I : | IV |
| Mean ACE scores | 51.9756 | 52.1428 | 53.3529[2] | 63.6538 |

[1]For purposes of this study curriculum I - Agricultural Education, Curriculum II - Agricultural Economics, Curriculum III - Animal Husbandry, Curriculum IV - Agronomy.

[2]The underlining indicates that no significant differences existed.

The analysis exhibited in Table 2 indicates that there was a significant difference among curriculums in the mean ACE scores at the time the 234 students entered Kansas State University. Students who entered the Agronomy curriculum (column IV) have a considerably higher mean ACE score than students entering the other three curriculums. If ACE scores are valid in predicting college success then Agronomy students would be expected to make better grades in college courses. Also, students in Agriculture Education, Agriculture Economics and Animal Husbandry would be expected to make nearly equal grades.

Table 3. The number and per cent of letter grades received by students among curriculums in the 14 courses.

| Curriculum | Grade and per cent | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | % | B | % | C | % | D | % | F | % |
| I | 120 | 19.05 | 224 | 35.55 | 219 | 34.76 | 58 | 9.21 | 9 | 1.43 |
| II | 83 | 10.99 | 265 | 35.10 | 308 | 40.80 | 86 | 11.39 | 13 | 1.72 |
| III | 211 | 15.71 | 511 | 38.05 | 466 | 34.70 | 128 | 9.53 | 27 | 2.01 |
| IV | 65 | 13.95 | 199 | 42.70 | 161 | 34.55 | 36 | 7.73 | 5 | 1.07 |
| Total | 479 | 14.10 | 1199 | 37.54 | 1154 | 36.13 | 308 | 9.64 | 54 | 1.69 |

Recorded in Table 3 is the frequency and per cent of the letter grades received by students in each of the four curriculums. When the A's and B's were considered together the curriculums of Agronomy, Agricultural Education and Animal Husbandry ranked first, second and third respectively with a much smaller percentage for students in Agricultural Economics. Animal Husbandry showed the greatest percentage of F's.

In order to more accurately compare the curriculums, a calculation was made of the proportion of the letter grades received within each curriculum. The data presented in Table 4 gives a more accurate comparison of the differences found among curriculums since it accounts for differences in the number of students compared in the four curriculums.

Table 4. The proportionability and deviation of grades received compared to the grades expected. (all values x 100)

| Curriculum | Grade and Deviation (d) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | d | B | d | C | d | D | d | F | d |
| Expected | 15 | - | 38 | | 36 | | 10 | | 2 | |
| Agricultural Education | 19 | -4 | 36 | -2 | 35 | -1 | 9 | -1 | 1 | -1 |
| Agricultural Economics | 11 | -4 | 35 | -3 | 41 | -5 | 11 | -1 | 2 | 0 |
| Animal Husbandry | 16 | -1 | 38 | 0 | 35 | -1 | 10 | 0 | 2 | 0 |
| Agronomy | 14 | -1 | 43 | -5 | 35 | -1 | 8 | -2 | 1 | -1 |

The data presented in Table 4 indicated that the students in the curriculums Agricultural Education and Agronomy earned more A's and B's than was expected of them. They also earned fewer D's and F's. Students majoring in Economics earned considerably fewer A's and B's while excelling other curriculums only in C's and D's.

To further analyze the performance of the students among curriculums in the 14 courses the Chi square test was performed. This test is often referred to as a test of independence. It was assumed in this study that some proportionality existed between the grade received among curriculums and the grades that students were expected to receive. The null hypothesis was that there was no difference in the performance of the students among curriculums in all the courses. A chi square value of 36.32, which is highly significant, ($P < .001$) was obtained. A chi-square value of this size meant that there was a significant difference in the performance of students among curriculums in all the courses, therefore the null hypothesis was rejected. Acceptance of the alternate hypothesis was necessary, it being that there

was a difference in the performance of students among curriculums in all 14 courses.

Because of the existing differences in the performance among curriculums for all the courses it was necessary to make comparisons among curriculums within each course for all courses. (see appendix A). The H-test was used to make these comparisons. The mean ranks and corresponding probabilities of equal means for each curriculum in the 14 courses are given in Table 5. Significant H-values, as read from the chi-square table, appeared for the courses Written Communications I and II, Elements of Animal Husbandry Lecture and Laboratory and Farm crops. The H values for the courses Written Communications II and Animal Husbandry Lecture were significant as read from the Chi-square table while those for Written Communications I, Elements of Animal Husbandry Laboratory and Farm Crops were highly significant. The H values for the remaining nine courses indicated that the students performed as expected and that there was no difference in the student's grades among curriculums. The nine courses showing no difference were General Geology, Elements of Dairying, Farm Poultry Production Lecture, Farm Poultry Production Laboratory, Organic Chemistry, Agricultural Journalism, Economics I, Soils and Principles of Feeds and Feeding.

Since no test was available to test differences in mean grade point averages it was necessary to assign a rank to the grades in order to test significance. This was the purpose of the H values. (Ranking procedure explained in Methods and Materials section, page 4). It was noted that if the mean rank

for each curriculum in each course in Table 5 was positioned as were the grade point averages in Table 4 the assigned position for each curriculum nearly corresponds in both tables. This was to be expected since mean ranks are not completely independent of grades.

Table 5. The mean ranks and corresponding probabilities for each of the 14 courses.

| Curriculum | Mean Rank | p* | Curriculum | Mean rank | p* |
|---|---|---|---|---|---|
| **Written Communications I** | | | **Written Communications II** | | |
| I | 115.03 | | I | 117.37 | |
| II | 121.84 | $p < .001$ | II | 126.90 | $.20 < p < .50$ |
| III | 123.61 | | III | 122.07 | |
| IV | 95.97 | | IV | 88.47 | |
| **General Geology** | | | **Elements of Animal Husbandry Lecture** | | |
| I | 97.08 | | I | 111.73 | |
| II | 118.19 | $.50 < p < .70$ | II | 139.56 | $.01 < p < .02$ |
| III | 101.30 | | III | 103.15 | |
| IV | 107.43 | | IV | 127.38 | |
| **Elements of Animal Husbandry Laboratory** | | | **Elements of Dairying** | | |
| I | 116.44 | | I | 117.57 | |
| II | 138.84 | $.001 < p < .01$ | II | 136.94 | $.10 < p < .20$ |
| III | 101.28 | | III | 112.44 | |
| IV | 124.85 | | IV | 97.96 | |
| **Farm Poultry Production Lecture** | | | **Farm Poultry Production Laboratory** | | |
| I | 95.80 | | I | 130.49 | |
| II | 124.29 | $.10 < p < .20$ | II | 116.75 | $.10 < p < .20$ |
| III | 120.31 | | III | 110.77 | |
| IV | 123.24 | | IV | 113.55 | |

Table 5. (concl.)

| Curriculum | Mean Rank | p* | Curriculum | Mean Rank | p* |
|---|---|---|---|---|---|
| Organic Chemistry | | | Agricultural Journalism | | |
| I | 98.33 | | I | 114.79 | |
| II | 94.22 | .50/p/.70 | II | 101.90 | .10/p/.20 |
| III | 101.73 | | III | 117.12 | |
| IV | 83.35 | | IV | 118.73 | |
| Economics | | | Soils | | |
| I | 102.59 | | I | 113.27 | |
| II | 122.81 | .30/p/.50 | II | 128.00 | .50/p/.70 |
| III | 122.14 | | III | 115.59 | |
| IV | 114.91 | | IV | 106.53 | |
| Farm Crops | | | Principles of Feeds and Feeding | | |
| I | 79.44 | | I | 117.72 | |
| II | 139.20 | p/.001 | II | 130.91 | .30/p/.50 |
| III | 125.24 | | III | 111.38 | |
| IV | 110.09 | | IV | 111.20 | |

*P (Probability that the mean ranks estimate a common mean)

Grade point averages for students within each curriculum are given in Table 6. Although the sum of the ranks were tested by H, the individual ranks were determined by the student's grades. Since grades are more easily interpreted than ranks, Table 6 will be more meaningful. The data in Table 6 were not used to perform any tests of likenesses nor differences but was merely to indicate the mean grade point averages and positions of curriculums in each course.

Table 6. Mean grade point averages and position of the four curriculums in the 14 courses.

| Curriculum | Mean Grade | Position | Curriculum | Mean Grade | Position |
|---|---|---|---|---|---|
| **Written Communications I** | | | **Written Communications II** | | |
| I | 3.3333 | 2nd | I | 3.0889 | 2nd |
| II | 3.4746 | 4th | II | 3.2034 | 4th |
| III | 3.4479 | 3rd | III | 3.1771 | 3rd |
| IV | 3.1176 | 1st | IV | 2.7353 | 1st |
| **General Geology** | | | **Elements of Animal Husbandry Lecture** | | |
| I | 2.4444 | 1st | I | 2.1778 | 2nd |
| II | 2.7813 | 4th | II | 2.6271 | 4th |
| III | 2.5208 | 2nd | III | 2.0729 | 1st |
| IV | 2.5882 | 3rd | IV | 2.4118 | 3rd |
| **Elements of Animal Husbandry Laboratory** | | | **Elements of Dairying** | | |
| I | 2.0667 | 2nd | I | 2.2889 | 3rd |
| II | 2.3276 | 4th | II | 2.5254 | 4th |
| III | 1.8750 | 1st | III | 2.2396 | 2nd |
| IV | 2.2059 | 3rd | IV | 2.0882 | 1st |
| **Farm Poultry Lecture** | | | **Farm Poultry Laboratory** | | |
| I | 1.8889 | 1st | I | 2.3111 | 4th |
| II | 2.2712 | 3rd | II | 2.1186 | 3rd |
| III | 2.1771 | 2nd | III | 2.0521 | 1st |
| IV | 2.2727 | 4th | IV | 2.0625 | 2nd |
| **Organic Chemistry** | | | **Agricultural Journalism** | | |
| I | 2.7778 | 3rd | I | 2.0889 | 2nd |
| II | 2.6667 | 2nd | II | 1.9298 | 1st |
| III | 2.8333 | 4th | III | 2.0947 | 3rd |
| IV | 2.5294 | 1st | IV | 2.1071 | 4th |
| **Economics I** | | | **Soils** | | |
| I | 2.4667 | 2nd | I | 2.4000 | 2nd |
| II | 2.7288 | 4th | II | 2.6102 | 4th |
| III | 1.6667 | 1st | III | 2.4375 | 3rd |
| IV | 2.6176 | 3rd | IV | 2.3030 | 1st |
| **Farm Crops** | | | **Principles of Feeds and Feeding** | | |
| I | 1.6889 | 1st | I | 2.3556 | 3rd |
| II | 2.4237 | 4th | II | 2.5254 | 4th |
| III | 2.2396 | 3rd | III | 2.2917 | 1st |
| IV | 2.0588 | 2nd | IV | 2.3235 | 2nd |

It should be noted, since the letter grade of A was assigned the numerical value of 1 and the letter grade of B was assigned the numerical value of 2, etc., that the curriculum having the lowest mean value should be ranked one and the remainder ranked from lowest to highest. For example, in the course Principles of Feeds and Feeding the mean grade points are positioned from lowest to highest, i.e., 2.2917, 2.3235, 2.3556, 2.5254 and thus are assigned the position 1, 2, 3, 4 respectively.

Table 7. The frequency of the composite positions for which each curriculum was ranked 1, 2, 3 and 4.

| Curriculum | Frequency of Position | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Agricultural Education | 3 | 7 | 3 | 1 |
| Agricultural Economics | 1 | 1 | 2 | 10 |
| Animal Husbandry | 5 | 3 | 5 | 1 |
| Agronomy | 5 | 3 | 4 | 2 |

Table 7 shows the composite positions for which each curriculum was positioned 1, 2, 3, 4. It is a summary table showing that students in Agricultural Education had the highest mean grade point average in three of the 14 courses. They had the second highest mean grade point average in seven of the 14 courses, third highest in three courses, etc. If the number of times a curriculum was positioned one or two is considered at once it was noted that this frequency was ten for Agricultural Education students while for Animal Husbandry and Agronomy it was eight each. It was also noticed that Agricultural Economics students were positioned

fourth, ten times. Thus Curriculums I, III and IV excel Curriculum II in scholastic achievement in the 14 courses compared in this study.

Table 8. Composite Chi-square values comparing all the students who had vocational agriculture in high school to those who did not have vocational agriculture.

| Grade | Vo. Ag. O | Vo. Ag. E | No Vo. Ag. O | No Vo. Ag. E | O-E | $(O-E)^2$ | $\frac{(O-E)^2}{E}$ Vo. Ag. | $\frac{(O-E)^2}{E}$ No Vo. Ag. |
|---|---|---|---|---|---|---|---|---|
| A | 310 | 284.34 | 169 | 194.66 | 25.66 | 659.44 | 2.3157 | 3.3825 |
| B | 732 | 711.74 | 367 | 487.26 | 20.26 | 410.47 | .5767 | .8424 |
| C | 649 | 685.03 | 505 | 468.97 | 36.03 | 1298.16 | 1.8950 | 2.7681 |
| D | 176 | 182.83 | 132 | 125.17 | 6.83 | 46.65 | .2551 | .3727 |
| F | 29 | 32.06 | 25 | 21.94 | 3.06 | 9.36 | .2920 | .4266 |
| Sub total | | | | | | | 5.3346 | 7.7923 |
| Total | | | | | | | $x^2 = 13.1269$ | |

This Chi-square value of 13.1269 indicates a significant difference in the performance of the students having vocational agriculture in high school compared to those who did not. The data presented in Table 8 describe some of these differences. It was noted that the students who had vocational agriculture in high school made considerably more A's and B's than was expected of them. The students who did not have vocational agriculture acquired more C's, D's and F's than was expected.

To further describe these differences a Chi-square was performed for each of the 14 courses. (see appendix B)

Table 9. Chi-square values comparing vocational agriculture students with non-vocational agriculture students for each of the 14 courses and their respective probabilities, with 4 degrees of freedom.

| Course | Chi-square | Tabled Value | Probability of a larger value |
|---|---|---|---|
| Written Communications I | 1.9966 | 9.49 | .50/p/.75 |
| Written Communications II | 3.3362 | 9.49 | .50/p/.75 |
| General Geology | 4.2516 | 9.49 | .25/p/.50 |
| Elements of Animal Husbandry Lecture | 4.5206 | 9.49 | .25/p/.50 |
| Elements of Animal Husbandry Laboratory | 14.9634 | 9.49 | p/.005 |
| Elements of Dairying | 5.4279 | 9.49 | .10/p/.25 |
| Farm Poultry Production Lecture | 5.9000 | 9.49 | .10/p/.25 |
| Farm Poultry Production Laboratory | 5.8508 | 9.49 | .10/p/.25 |
| Organic Chemistry | 2.7981 | 9.49 | .50/p/.75 |
| Agricultural Journalism | .6022 | 9.49 | .950/p/.975 |
| Economics I | 1.7942 | 9.49 | .750/p/.90 |
| Soils | 1.6107 | 9.49 | .750/p/.90 |
| Farm Crops | 7.0963 | 9.49 | .10/p/.25 |
| Principles of Feeds and Feeding | 4.9936 | 9.49 | .25/p/.50 |

Again the null hypothesis was that there was no difference in the performance of students who offered entrance credit in high school vocational agriculture compared to those who did not. It was seen from Table 9 that 13 of the 14 courses proved a non-significant chi-square. This means that the null hypothesis was accepted and that there was no difference in the performance of students having vocational agriculture and those who did not. Those students who had taken vocational agriculture in high school were as well or better prepared for the 14 courses included in this study as those who were enrolled in other curriculums in high school. One one-hour course, Elements of Animal Husbandry

Laboratory, yielded a chi-square value which was significant at P = .05. This means that the null hypothesis must be rejected in favor of the alternate hypothesis. The alternate hypothesis being that there was a difference in the performance of the students in the two groups in favor of those who had high school vocational agriculture.

A study of Table 9 also reveals that the chi-square values for the courses Elements of Dairying, Farm Poultry Production Lecture and Laboratory and Farm Crops are approaching significance.

It was concluded that students who offered high school vocational agriculture as entrance credit could be expected to obtain better grades when all the courses were compared. However, when the courses were analyzed individually, only the courses that students had been trained in high school which included training for agricultural contest competition, had chi-square values which were significant or came close to significance.

A more conclusive comparison was made when the mean grade point average of the four curriculums for all the courses was compared with the ratio of the number of students who had had vocational agriculture in high school.

Table 10. The ratio of vocational agriculture students to the total number of students in each curriculum with their corresponding grade point averages for all courses.

| Curriculum | f | Vo. Ag. | Ratio Vo. Ag. | Position | Mean Grade Point Average | Position |
|---|---|---|---|---|---|---|
| I | 45 | 32 | .7111 | 1 | 2.3841 | 1 |
| II | 59 | 28 | .4746 | 4 | 2.5775 | 4 |
| III | 96 | 61 | .6354 | 2 | 2.4408 | 3 |
| IV | 34 | 17 | .5000 | 3 | 2.3927 | 2 |

The data in Table 10 indicate that students majoring in Agricultural Education had the largest per cent of students who had taken vocational agriculture in high school. Students in Agricultural Education also earned the highest grade point average in the 14 courses compared in this study. They surpassed the second ranked Agronomy students by .0086 of a grade point. Agricultural Economics had the lowest per cent of students who had high school vocational agriculture and likewise had the lowest grade point average for all courses. Although only 50 per cent of the Agronomy students had high school vocational agriculture compared to 63.54 per cent for Animal Husbandry, they excelled Animal Husbandry students in total grade point average by .0481 of a grade point. Thus, the higher the relative frequency of students who had high school vocational agriculture in each curriculum the higher the grade point averages were for all the courses compared in this study.

## SUMMARY

The delimitations that students must have been graduated from a Kansas high school, begun and finished their college education at Kansas State University, remained in the same curriculum the entire time and completed their college education within eight semesters and one summer session, was reason to believe that no significant differences would appear in the variables compared in this study. However, by the use of appropriate statistical procedures, it was found that differences in the performances of students in the four curriculums did exist.

Foremost, it was found that the scholastic aptitude, as measured by ACE score upon entering college, varied considerably among curriculums. The mean ACE score for the students in Agronomy was 63.65. This was 10.30 points above the second ranked Agricultural Education students which had 53.35, followed by Agricultural Economics and Animal Husbandry which had 52.14 and 51.98 respectively. If success in college was to be predicted by ACE scores alone Agronomy students would be expected to obtain the best grades while Agricultural Education, Agricultural Economics and Animal Husbandry students would make nearly equal grades.

Further analysis revealed that Agronomy students did not excel scholastically. They were surpassed by Agriculture Education students and followed by Animal Husbandry and Economics students in that order. Thus, for the curriculums compared in this study the ACE scores failed to predict the performance of students among curriculums.

Other analysis revealed that some variation existed in the performance of students in the 14 courses compared in the study. When all courses were combined and comparisons made among curriculums a Chi-square value of 36.32 was obtained. This is significant at the .05 level of probability. Since the Chi-square value of 36.32 was significant further tests were performed in order to detect, within individual courses, where these differences were. Significant Chi-square values were obtained in the courses Written Communications I and II, Elements of Animal Husbandry Lecture and Laboratory and Farm Crops. No

test was available however, to determine which curriculum or curriculums were responsible for significant Chi-square values in these courses.

When the data were analyzed on the basis of whether or not students within each curriculum had taken vocational agriculture in high school it was found that significant differences existed favoring those who had taken high school vocational agriculture. Irregardless of whether or not significant differences existed it was found that in most cases the students who had taken vocational agriculture in high school made more A's and B's than was expected of them while students who had not taken vocational agriculture earned more C's, D's and F's. It was concluded that students who had taken high school vocational agriculture were by no means inferiorly prepared to adequately comprehend the 14 college level courses included in this study.

Other comparisons indicated that the ratio of high school vocational agriculture students in each of the four curriculums could be used as an indicator of performance in the courses compared in this study. To describe further this circumstance it was noted that the curriculum having the largest per cent of vocational agriculture students earned the highest mean grade point average and likewise the curriculum having the smallest per cent of vocational agriculture students had the lowest mean point average. From this it was concluded that the per cent of vocational agriculture students in each curriculum could be used to estimate the scholastic performance of students in college courses.

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LITERATURE CITED

(1) Bell, Paul Albert
Comparison of college grades received by students having and not having vocational agriculture in high school. Research problem, M. S., Stillwater, Oklahoma A and M College, 1953.

(2) Bicknell, John Evans
Effectiveness of vocational agriculture in high school as preparation for students of agriculture at Iowa State College. Masters Thesis. Ames, Iowa State College, 1957.

(3) Bruch, Robert P.
Relationship of training in high school vocational agriculture to college marks in designated courses at the University of Missouri. Excerpt from non-thesis study. Columbia, Missouri University, 1957.

(4) Circle, Duncan Fulton
Comparison of certain factors between college graduates who took vocational agriculture in high school and those who did not. Masters report. Manhattan, Kansas University, 1957.

(5) Fisher, Ronald A. and Yates, Frank
Statistical tables for biological, agriculture and medical research. New York, Hafuer Publishing Co. Inc. 1957.

(6) Geffert, Bessie
Comparative scholastic ratings of fraternity and non-fraternity studies. Masters thesis. Manhattan, Kansas State University, 1930.

(7) Hoyt, Donald P.
The use of multiple variables in the prediction of academic success. Research Report No. 12, Student Counseling Center. Kansas State College, 1958.

(8) Hoyt, Donald P.
Size of high school and academic performance at Kansas State College. Research Report No. 11. Student Counseling Center. Kansas State College, 1958.

(9) Kruskal, William H. and Wallis, W. Allen
Use of ranks in one-criterion variance analysis. Journal of the American Statistical Association. Volume 47, page 583-621. December, 1952.

(10) Long, James S.
The performance of former students of vocational agriculture in the school of engineering at Oregon State College. Masters thesis. Covallis, Oregon State College, 1958.

(11) Luster, George L.
The nature and status of selected freshmen in the college of agriculture with implications for guidance. Non-thesis study. Columbus, Ohio State University, 1954.

(12) Moss, Nuel L.
Vocational agriculture credits from high school as a basis for college agriculture work. Masters thesis. Lubbock, Technological College, 1957.

(13) Neilson, Duane M.
The relationship of high school vocational agriculture to establishment of graduates in farming and other occupations. Non-thesis study. Ames, Iowa State College, 1959.

(14) Pedersen, Charles Edward
The performance of former vocational agriculture students at Oregon State College. Masters-thesis Corvallis, Oregon State College, 1959.

(15) Snedecor, George W.
Statistical methods applied to experiments in agriculture and biology. Ames, Iowa. Iowa State College press. 1957.

(16) Wiggins, Charles S.
The effectiveness of vocational agriculture in high school as a basis for the four-year courses in agriculture at the Pennsylvania State College, 1953.

# APPENDIX A

Table 1. H values comparing the grades received among curriculums in Written Communications I

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 1 | 2 | 2 | 0 | 2 | 0 | 2 | 2 | 4 | 0 | 2 | 0 | 3 |
| B | 6 | 17.5 | 105 | 5 | 17.5 | 87.5 | 11 | 17.5 | 192.5 | 6 | 17.5 | 105 | 28 |
| C | 19 | 84 | 1596 | 30 | 84 | 2520 | 36 | 84 | 3024 | 20 | 84 | 1680 | 105 |
| D | 15 | 172.5 | 2587.5 | 15 | 172.5 | 2587.5 | 36 | 172.5 | 6210.0 | 6 | 172.5 | 1035 | 72 |
| F | 4 | 221.5 | 886.0 | 9 | 221.5 | 1993.5 | 11 | 221.5 | 2436.5 | 2 | 221.5 | 443 | 26 |
| | 45 | | 5176.5 | 59 | | 7188.5 | 96 | | 11867.0 | 34 | | 3263.0 | 234 |

$\Sigma R^2/N = 3421969.62$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{41063635.44}{54990} - 705}{.8774}$$

$H = 47.58$

Table 2. H values comparing the grades received among curriculums in Written Communications II

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 1 | 1.5 | 1.5 | 0 | 1.5 | 0 | 1 | 1.5 | 1.5 | 0 | 1.5 | 0 | 2 |
| B | 10 | 27 | 270 | 6 | 27 | 162 | 19 | 27 | 513 | 14 | 27 | 378 | 49 |
| C | 20 | 110 | 2200 | 36 | 110 | 3960 | 46 | 110 | 5060 | 15 | 110 | 1650 | 117 |
| D | 12 | 196 | 2352 | 16 | 196 | 3136 | 22 | 196 | 4312 | 5 | 196 | 980 | 55 |
| F | 2 | 229 | 458 | 1 | 229 | 229 | 8 | 229 | 1832 | 0 | 229 | 0 | 11 |
| | 45 | | 5281.5 | 59 | | 7487 | 96 | | 11718.5 | 34 | | 3008 | 234 |

$\Sigma R^2/N = 3266529.66$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{39198355.92}{54990} - 705}{.8528}$$

$H = 9.18$

Table 3. H values comparing the grades received among curriculums in General Geology

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 7 | 16 | 112 | 3 | 16 | 48 | 16 | 16 | 256 | 5 | 16 | 80 | 31 |
| B | 14 | 59 | 826 | 8 | 59 | 472 | 26 | 59 | 1534 | 7 | 59 | 413 | 55 |
| C | 21 | 135.5 | 2845.5 | 14 | 135.5 | 1897 | 44 | 135.5 | 5962 | 19 | 135.5 | 2574.5 | 98 |
| D | 3 | 195.0 | 585.0 | 7 | 195.0 | 1365 | 8 | 195.0 | 1560 | 3 | 195.0 | 585.0 | 21 |
| F | 0 | 206.5 | 0 | 0 | 206.5 | 0 | 2 | 206.5 | 413.0 | 0 | 206.5 | 0 | 2 |
| | 45 | | 4368.5 | 32 | | 3782 | 96 | | 9725 | 34 | | 3652.5 | 207 |

$\Sigma R^2/N = 2248607.33$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{26983287.96}{43056} - 624}{.8708}$$

$H = 3.10$

Table 4. H values comparing the grades received among curriculums in Elements of Animal Husbandry Lecture

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 12 | 26.5 | 318.0 | 8 | 26.5 | 212 | 28 | 26.5 | 742 | 4 | 26.5 | 106 | 52 |
| B | 16 | 98.5 | 1576 | 19 | 98.5 | 1871.5 | 41 | 98.5 | 4038.5 | 16 | 98.5 | 1576 | 92 |
| C | 14 | 176.5 | 2471 | 21 | 176.5 | 3706.5 | 19 | 176.5 | 3353.5 | 10 | 176.5 | 1765 | 64 |
| D | 3 | 221.0 | 663 | 10 | 221.0 | 2210.0 | 8 | 221.0 | 1768.0 | 4 | 221.0 | 884 | 25 |
| F | 0 | 234.0 | 0 | 1 | 234.0 | 234.0 | 0 | 234.0 | 0 | 0 | 234.0 | 0 | 1 |
| | 45 | | 5028.0 | 59 | | 8234.0 | 96 | | 9902.0 | 34 | | 4331 | 234 |

$\Sigma R^2/N = 3283969.57$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{39407634.84}{54990} - 705}{.9066}$$

$H = 12.83$

Table 5. H values comparing the grades received among curriculums in Elements of Animal Husbandry Laboratory

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 11 | 28 | 308 | 7 | 28 | 196 | 30 | 28 | 840 | 7 | 28 | 196 | 55 |
| B | 21 | 111 | 2331 | 26 | 111 | 2886 | 48 | 111 | 5328 | 16 | 111 | 1776 | 111 |
| C | 12 | 197.5 | 2370 | 24 | 197.5 | 4740 | 18 | 197.5 | 3555 | 8 | 197.5 | 1580 | 62 |
| D | 1 | 231.0 | 231 | 1 | 231.0 | 231 | 0 | 231.0 | 0 | 3 | 231.0 | 693 | 5 |
| F | 0 | | | 0 | | 0 | 0 | | 0 | 0 | | | 0 |
| | 45 | | 5240 | 58 | | 8053 | 96 | | 9723 | 34 | | 4245 | 233 |

$\Sigma R^2/N = 32430\frac{44}{100}.60$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{38916535.20}{54522} - 702}{.8662}$$

$H = 13.58$

Table 6. H values comparing the grades received among curriculums in Elements of Dairying

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 7 | 17.5 | 122.5 | 5 | 17.5 | 87.5 | 15 | 17.5 | 262.5 | 7 | 17.5 | 122.5 | 34 |
| B | 19 | 87 | 1653.0 | 21 | 87 | 1827 | 46 | 87 | 4002.0 | 19 | 87 | 1653.0 | 105 |
| C | 18 | 182.5 | 3285.0 | 30 | 182.5 | 5475.0 | 32 | 182.5 | 5840.0 | 6 | 182.5 | 1095.0 | 86 |
| D | 1 | 230.0 | 230.0 | 3 | 230.0 | 690.0 | 3 | 230.0 | 690.0 | 2 | 230.0 | 460.0 | 9 |
| F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 45 | | 5290.5 | 59 | | 8079.5 | 96 | | 10794.5 | 34 | | 3330.5 | 234 |

$\Sigma R^2/N = 3268393.54$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1 - \Sigma T/(N^3-N)}$$

$$= \frac{\frac{39220722.48}{54990} - 705}{.8569}$$

$H = 7.27$

Table 7. H values comparing the grades received among curriculums in Farm Poultry Production Lecture

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 14 | 21.5 | 301 | 6 | 21.5 | 129 | 17 | 21.5 | 365.5 | 5 | 21.5 | 107.5 | 42 |
| B | 22 | 102.5 | 2255. | 35 | 102.5 | 3587.5 | 46 | 102.5 | 4715.0 | 17 | 102.5 | 1742.5 | 120 |
| C | 9 | 195.0 | 1755.0 | 15 | 195.0 | 2925.0 | 32 | 195.0 | 6240.0 | 9 | 195.0 | 1755.0 | 65 |
| D | 0 | 229.5 | 0 | 2 | 229.5 | 459.0 | 1 | 229.5 | 229.5 | 1 | 229.5 | 229.5 | 4 |
| F | 0 | 232.5 | 0 | 1 | 232.5 | 232.5 | 0 | 232.5 | 0 | 1 | 232.5 | 232.5 | 2 |
| | 45 | | 4311.0 | 59 | | 7333.0 | 96 | | 11550.0 | 33 | | 4067.0 | 233 |

$\Sigma R^2/N = 3215235.00$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{38582820.00}{54522} - 702}{.8569}$$

$H = 6.78$

Table 8. H values comparing the grades received among curriculums in Farm Poultry Production Laboratory

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 7 | 29.5 | 206.5 | 17 | 29.5 | 501.5 | 25 | 29.5 | 737.5 | 9 | 29.5 | 265.5 | 58 |
| B | 20 | 106.5 | 2130.0 | 20 | 106.5 | 2130.0 | 44 | 106.5 | 4686.0 | 12 | 106.5 | 1278.0 | 96 |
| C | 15 | 190.0 | 2850.0 | 20 | 190.0 | 3800.0 | 25 | 190.0 | 4750.0 | 11 | 190.0 | 2090.0 | 71 |
| D | 3 | 228.5 | 685.5 | 2 | 228.5 | 457.0 | 1 | 228.5 | 228.5 | 0 | 228.5 | 0 | 6 |
| F | 0 | 232.0 | 0 | 0 | 232.0 | 0 | 1 | 232.0 | 232.0 | 0 | 232.0 | 0 | 1 |
| | 45 | | 5872.0 | 59 | | 1888.5 | 96 | | 10634.0 | 32 | | 3633.5 | 232 |

$\Sigma R^2/N = 3174310.72$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{38091728.64}{54056} - 699}{.8849}$$

$H = 6.41$

Table 9. H values comparing the grades received among curriculums in Organic Chemistry

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 4 | 10 | 40 | 2 | 10 | 20 | 7 | 10 | 70 | 6 | 10 | 60 | 19 |
| B | 11 | 45 | 495 | 4 | 45 | 180 | 25 | 45 | 1125 | 11 | 45 | 495 | 51 |
| C | 23 | 115 | 2645 | 10 | 115 | 1150 | 44 | 115 | 5060 | 12 | 115 | 1380 | 89 |
| D | 5 | 173 | 865 | 2 | 173 | 346 | 17 | 173 | 2941 | 3 | 173 | 519 | 27 |
| F | 2 | 190 | 380 | 0 | 190 | 0 | 3 | 190 | 570 | 2 | 190 | 380 | 7 |
| | 45 | | 4425 | 18 | | 1696 | 96 | | 9766 | 34 | | 2834 | 193 |

$\Sigma R^2/N = 1824635.46$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{21895625.52}{37442} - 582}{.8798}$$

$H = 3.17$

Table 10. H values comparing the grades received among curriculums in Agricultural Journalism

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 11 | 26 | 286 | 16 | 26 | 416 | 19 | 26 | 494 | 5 | 26 | 130 | 51 |
| B | 21 | 109.5 | 2299.5 | 31 | 109.5 | 3394.5 | 49 | 109.5 | 5365.5 | 15 | 109.5 | 1642.5 | 116 |
| C | 11 | 194 | 2134 | 8 | 194 | 1552. | 26 | 194 | 5044 | 8 | 194 | 1552 | 53 |
| D | 2 | 223 | 446 | 2 | 223 | 446 | 1 | 223 | 223 | 0 | 223 | 0 | 5 |
| F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 45 | | 5165.5 | 57 | | 5808.5 | 95 | | 11126.5 | 28 | | 3324.5 | 225 |

$\Sigma R^2/N = 2882720.93$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{34592651.16}{50850} - 675}{.8383}$$

$H = 6.31$

Table 11. H values comparing the grades received among curriculums in Economics I

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 6 | 10.5 | 63 | 3 | 10.5 | 31.5 | 8 | 10.5 | 84 | 3 | 10.5 | 31.5 | 20 |
| B | 17 | 55 | 935 | 17 | 55 | 935 | 25 | 55 | 1375 | 10 | 55 | 550. | 69 |
| C | 17 | 148 | 2516 | 32 | 148 | 4736 | 50 | 148 | 7400 | 18 | 148 | 2664 | 117 |
| D | 5 | 220.5 | 1102.5 | 7 | 220.5 | 1543.5 | 13 | 220.5 | 2866.5 | 3 | 220.5 | 661.5 | 28 |
| F | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 45 | | 4616.5 | 59 | | 7246.0 | 96 | | 11725.5 | 34 | | 3907.0 | 234 |

$\Sigma R^2/N = 3244628.81$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1 - \Sigma T/(N^3-N)}$$

$$= \frac{\frac{38935545.72}{54990} - 705}{.8470}$$

$H = 3.60$

Table 12. H values comparing the grades received among curriculums in Soils

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 9 | 15.5 | 139.5 | 4 | 15.5 | 62 | 14 | 15.5 | 217 | 3 | 15.5 | 46.5 | 39 |
| B | 15 | 78.5 | 1177.5 | 24 | 78.5 | 1884.0 | 39 | 78.5 | 3061.5 | 18 | 78.5 | 1413.0 | 96 |
| C | 16 | 167.0 | 2672.0 | 23 | 167.0 | 3841.0 | 31 | 167.0 | 5177. | 11 | 167.0 | 1837.0 | 81 |
| D | 4 | 219.0 | 876.0 | 7 | 219.0 | 1533.0 | 11 | 219.0 | 2409.0 | 1 | 219.0 | 219.0 | 23 |
| F | 1 | 232.0 | 232. | 1 | 232.0 | 232. | 1 | 232.0 | 232. | 0 | 232.0 | 0 | 3 |
| | 45 | | 5097.0 | 59 | | 7552.0 | 96 | | 11096.5 | 33 | | 3515.5 | 233 |

$\Sigma R^2/N = 3201111.73$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{38413340.76}{54522} - 702}{.8828}$$

$H = 2.89$

Table 13. H values comparing the grades received among curriculums in Farm Crops

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 21 | 23 | 483 | 4 | 23 | 92 | 13 | 23 | 299 | 7 | 23 | 161 | 45 |
| B | 17 | 102 | 1734 | 30 | 102 | 3060 | 48 | 102 | 4896 | 18 | 102 | 1836 | 113 |
| C | 7 | 194 | 1357 | 21 | 194 | 4074 | 34 | 194 | 6596 | 9 | 194 | 1746 | 71 |
| D | 0 | 232 | 0 | 4 | 232 | 928 | 1 | 232 | 232 | 0 | 232 | 0 | 5 |
| F | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 |
| | 45 | | 3575 | 59 | | 8154 | 96 | | 12023 | 34 | | 3743 | 234 |

$\Sigma R^2/N = 3328740.10$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1 - \Sigma T/(N^3-N)}$$

$$= \frac{\frac{39944881.20}{54990} - 705}{.8524}$$

$H = 25.10$

Table 14. H values comparing the grades received among curriculums in Principles of Feeds and Feeding

| | Curriculum I | | | Curriculum II | | | Curriculum III | | | Curriculum IV | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | W | R | F | W | R | F | W | R | F | W | R | F |
| A | 9 | 19 | 171 | 8 | 19 | 152 | 16 | 19 | 304 | 4 | 19 | 76 | 37 |
| B | 15 | 86.5 | 1297.5 | 19 | 86.5 | 1643.5 | 44 | 86.5 | 3806 | 20 | 86.5 | 1730 | 98 |
| C | 17 | 173 | 2941 | 24 | 173 | 4152 | 29 | 173 | 5017 | 5 | 173 | 865 | 75 |
| D | 4 | 222 | 888 | 8 | 222 | 1776 | 6 | 222 | 1332 | 5 | 222 | 1110 | 23 |
| F | 0 | 234 | 0 | 0 | 234 | 0 | 1 | 234 | 234 | 0 | 234 | 0 | 1 |
| | 45 | | 5297.5 | 59 | | 7723.5 | 96 | | 10693 | 34 | | 3781 | 234 |

$\Sigma R^2/N = 3246205.68$

$$H = \frac{\left[\frac{12(\Sigma R^2/N)}{N(N+1)}\right] - 3(N+1)}{1-\Sigma T/(N^3-N)}$$

$$= \frac{\frac{38954468.16}{54990} - 705}{.8887}$$

$H = 3.81$

Table 15. Summary table of H values and their corresponding probabilities, as read from the chi square table, for tables 1 through 14 of appendix A.

| Course | : $X^2$ adjusted, 3 d.f. : | P |
|---|---|---|
| Written Communications I | 47.58 | P/.001 |
| Written Communications II | 9.18 | .02/P/.05 |
| General Geology | 3.10 | .30/P/.50 |
| Elements of Animal Husbandry Lecture | 12.83 | .001/P/.01 |
| Elements of Animal Husbandry Laboratory | 13.58 | .001/P/.01 |
| Elements of Dairying | 7.27 | .05 /P/.10 |
| Farm Poultry Production Lecture | 6.78 | .05/P/.10 |
| Farm Poultry Production Laboratory | 6.41 | .05/P/.10 |
| Organic Chemistry | 3.17 | .30/P/.50 |
| Agricultural Journalism | 6.31 | .05/P/.10 |
| Economics I | 3.60 | .30/P/.50 |
| Soils | 2.89 | .30/P/.50 |
| Farm Crops | 25.10 | P/.001 |
| Principles of Feeds and Feeding | 3.81 | .20/P/.30 |

APPENDIX B

Table 1. Chi square values and corresponding probabilities comparing vocational agricultural students with non vocational agricultural students.

Written Communications I

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | 1 | 1.7692 | 2 | 1.2308 | .7692 | .3344 | .4807 | | |
| B | 17 | 16.5128 | 11 | 11.4872 | .4872 | .0144 | .0207 | | |
| C | 60 | 61.9231 | 45 | 43.0769 | 3.6983 | .2209 | .3175 | | |
| D | 46 | 42.4615 | 26 | 29.5385 | 3.5385 | .2949 | .4239 | | |
| F | 14 | 15.3333 | 12 | 10.6667 | 1.3333 | .1159 | .1666 | | |
| | 138 | | 96 | | | .9805 | 1.4094 | 2.3899 | $.50 < P < .70$ |

Written Communications II

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | -- | 1.1795 | 2 | 0.8205 | 1.1795 | 1.1795 | 1.6956 | | |
| B | 30 | 28.8974 | 19 | 20.1026 | 1.8974 | .1246 | .1791 | | |
| C | 68 | 69.0000 | 49 | 48.0000 | 1.0000 | .0145 | .0208 | | |
| D | 33 | 32.4359 | 22 | 22.5641 | .5641 | .0098 | .0141 | | |
| F | 7 | 6.4872 | 4 | 4.5128 | .5128 | .0405 | .0583 | | |
| | 138 | | 96 | | | 1.3689 | 1.9679 | 3.3368 | $.50 < P < .70$ |

Table 1. (cont.)

General Geology

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $x^2$ | P |
| A | 19 | 19.3188 | 12 | 11.6812 | .3188 | .0053 | .0087 | | |
| B | 37 | 34.2754 | 18 | 20.7246 | 2.7246 | .2166 | .3582 | | |
| C | 59 | 61.0725 | 39 | 36.9275 | 2.0725 | .0703 | .1163 | | |
| D | 14 | 13.0870 | 7 | 7.9130 | .9130 | .0637 | .1053 | | |
| F | 0 | 1.2464 | 2 | 0.7536 | 1.2464 | 1.2464 | 2.0573 | | |
| | 129 | | 78 | | | 1.6023 | 2.6458 | 4.2481 | .30/P/.50 |

Elements of Animal Husbandry Lecture

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $x^2$ | P |
| A | 30 | 30.6667 | 22 | 21.3333 | .6667 | .0145 | .0208 | | |
| B | 58 | 54.2564 | 34 | 37.7436 | 3.7436 | .2583 | .3713 | | |
| C | 39 | 37.7436 | 25 | 26.2564 | 1.2564 | .0418 | .0601 | | |
| D | 11 | 14.7436 | 14 | 10.2564 | 3.7436 | .9506 | 1.3664 | | |
| F | 0 | 0.5897 | 1 | 0.4103 | .5897 | .5897 | .8475 | | |
| | 138 | | 96 | | | 1.8549 | 2.6661 | 4.5210 | .30/P/.50 |

Table 1. (cont.)

Elements of Animal Husbandry Laboratory

| | Vo. Ag. | | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | O | E | : | O | E | : O-E | : $\frac{(O-E)^2}{E}$ | : $\frac{(O-E)^2}{E}$ | : $X^2$ | : P |
| A | 41 | 32.3391 | | 14 | 22.6609 | 8.6609 | 2.3195 | 3.3102 | | |
| B | 68 | 65.2660 | | 43 | 45.7340 | 2.7340 | .1145 | .1634 | | |
| C | 27 | 36.4549 | | 35 | 25.5451 | 9.4549 | 2.4522 | 3.4995 | | |
| D | 1 | 2.9400 | | 4 | 2.0600 | 1.94 | 1.2801 | 1.8269 | | |
| F | 0 | 0 | | 0 | 0 | | | | | |
| | 137 | | | 96 | | | 6.1663 | 8.8000 | 14.9663 | .001/P/.01 |

Elements of Dairying

| | Vo. Ag. | | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | O | E | : | O | E | : O-E | : $\frac{(O-E)^2}{E}$ | : $\frac{(O-E)^2}{E}$ | : $X^2$ | : P |
| A | 22 | 20.0513 | | 12 | 13.9487 | 1.9487 | .1894 | .2722 | | |
| B | 63 | 61.9231 | | 42 | 43.0769 | 1.0769 | .0187 | .0269 | | |
| C | 50 | 50.7179 | | 36 | 35.2821 | .7179 | .0102 | .0146 | | |
| D | 3 | 5.3077 | | 6 | 3.6923 | 2.3077 | 1.0033 | 1.4423 | | |
| F | 0 | -- | | 0 | -- | | | | | |
| | 138 | | | 96 | | | 1.2216 | 1.7560 | 2.9776 | .50/P/.70 |

Table 1. (cont.)

Farm Poultry Production Lecture

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | 29 | 24.6953 | 13 | 17.3047 | 4.3047 | .7504 | 1.0708 | | |
| B | 73 | 70.5579 | 47 | 49.4421 | 2.4421 | .0845 | .1206 | | |
| C | 31 | 38.2189 | 34 | 26.7811 | 7.2189 | 1.3635 | 1.9459 | | |
| D | 3 | 2.3519 | 1 | 1.6481 | .6481 | .1786 | .2549 | | |
| F | 1 | 1.1760 | 1 | 0.8240 | .1760 | .0263 | .0376 | | |
| | 137 | | 96 | | | 2.4033 | 3.4298 | 5.8331 | .20/P/.30 |

Farm Poultry Production Laboratory

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | 35 | 34.2500 | 23 | 23.7500 | .7500 | .0164 | .0237 | | |
| B | 64 | 56.6897 | 32 | 39.3103 | 7.3103 | .9427 | 1.3594 | | |
| C | 35 | 41.9267 | 36 | 29.0733 | 6.9267 | 1.1444 | 1.6503 | | |
| D | 3 | 3.5431 | 3 | 2.4569 | .5431 | .0832 | .1200 | | |
| F | 0 | 0.5905 | 1 | 0.4095 | .4095 | .2840 | .4095 | | |
| | 137 | | 95 | | | 2.4707 | 3.5629 | 6.0336 | .10/P/.20 |

Table 1. (cont.)

Organic Chemistry

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | 13 | 11.7150 | 6 | 7.2850 | 1.2850 | .1409 | .2267 | | |
| B | 35 | 31.4456 | 16 | 19.5544 | 3.5544 | .4018 | .6461 | | |
| C | 50 | 54.0756 | 39 | 34.1244 | 4.8756 | .4332 | .6966 | | |
| D | 17 | 16.6477 | 10 | 10.3523 | .3523 | .0074 | .0120 | | |
| F | 4 | 4.3161 | 3 | 2.6839 | .3161 | .0232 | .0372 | | |
| | 119 | | 74 | | | 1.0065 | 1.6186 | 2.6251 | .50/P/.70 |

Agricultural Journalism

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | 32 | 30.3733 | 19 | 20.6267 | 1.6267 | .0871 | .1283 | | |
| B | 66 | 69.0844 | 50 | 46.9156 | 3.0844 | .1379 | .2028 | | |
| C | 33 | 31.5644 | 20 | 21.4356 | 1.4356 | .0653 | .0961 | | |
| D | 3 | 2.9778 | 2 | 2.0222 | .0222 | .0002 | .0002 | | |
| F | 0 | 0 | 0 | 0 | | | | | |
| | 134 | | 91 | | | .2903 | .4274 | .7177 | .90/P/.95 |

Table 1. (cont.)

Economics I

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | 12 | 11.7949 | 8 | 8.2051 | .2051 | .0036 | .0051 | | |
| B | 39 | 40.6923 | 30 | 28.3077 | 1.6923 | .0704 | .1012 | | |
| C | 68 | 69.0000 | 49 | 48.0000 | 1.0000 | .0145 | .0208 | | |
| D | 19 | 16.5128 | 9 | 11.4872 | 2.4872 | .3746 | .5385 | | |
| F | 0 | 0 | 0 | 0 | | | | | |
| | 138 | | 96 | | | .4631 | .6656 | 1.1287 | .80/P/.90 |

Soils

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | 19 | 17.6395 | 11 | 12.3605 | 1.3605 | .1049 | .1497 | | |
| B | 56 | 56.4464 | 40 | 39.5536 | .4464 | .0035 | .0050 | | |
| C | 49 | 47.6266 | 32 | 33.3734 | 1.3734 | .0396 | .0565 | | |
| D | 11 | 13.5236 | 12 | 9.4764 | 2.5236 | .4709 | .6720 | | |
| F | 2 | 1.7639 | 1 | 1.2361 | .2361 | .0316 | .0451 | | |
| | 137 | | 96 | | | .6505 | .9283 | 1.5788 | .80/P/.90 |

Table 1. (concl.)

Farm Crops

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | 32 | 26.5385 | 13 | 18.4615 | 5.4615 | 1.1240 | 1.6157 | | |
| B | 67 | 66.6410 | 46 | 46.3590 | .3590 | .0019 | .0028 | | |
| C | 37 | 41.8718 | 34 | 29.1282 | 7.8718 | 1.4799 | 2.1273 | | |
| D | 2 | 2.9487 | 3 | 2.0513 | .9489 | .3054 | .4389 | | |
| F | 0 | 0 | 0 | 0 | | | | | |
| | 138 | | 96 | | | 2.9112 | 4.1847 | 7.0959 | .10/P/.20 |

Principles of Feeds and Feeding

| | Vo. Ag. | | No Vo. Ag. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | E | O | E | O-E | $\frac{(O-E)^2}{E}$ | $\frac{(O-E)^2}{E}$ | $X^2$ | P |
| A | 25 | 21.8205 | 12 | 15.1795 | 3.1795 | .4633 | .6660 | | |
| B | 59 | 57.7949 | 39 | 40.2051 | 1.2051 | .0251 | .0361 | | |
| C | 43 | 44.2308 | 32 | 30.7692 | 1.2308 | .0342 | .0492 | | |
| D | 10 | 13.5641 | 13 | 9.4359 | 3.5641 | .9365 | 1.3462 | | |
| F | 1 | 0.5897 | 0 | 0.4103 | .5897 | .5897 | .8475 | | |
| | 138 | | 96 | | | 2.0488 | 2.9450 | 4.9938 | .20/P/.30 |

# RELATIONSHIP BETWEEN TRAINING IN VOCATIONAL AGRICULTURE AND SUCCESS IN SELECTED COURSES IN FOUR AGRICULTURAL CURRICULUMS AT KANSAS STATE UNIVERSITY

by

CLINTON RUSSELL

B. S., Kansas State University of Agriculture and Applied Science, 1958

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AN ABSTRACT OF A THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Education

KANSAS STATE UNIVERSITY
OF AGRICULTURE AND APPLIED SCIENCE

1960

The purpose of this study was to determine what effect vocational agriculture and other variables had upon the success of students in selected courses among four curriculums in the school of agriculture at Kansas State University. Included in the study was information concerning 234 students who were graduated in January, June or August of the years 1955 through 1958.

The data were collected from records in the Dean's Office, the Registrar's Office and the Counseling Office.

Several statistical methods were used to detect and measure differences in the performance of students in 14 courses among these curriculums. The data were analyzed on the basis of ACE scores of entering freshmen, whether or not they offered vocational agriculture as entrance credit and the grades received by students in the 14 courses.

The delimitations, that students must have been graduated from a Kansas high school, begun and completed their college at Kansas State University, remained in the same curriculum the entire time and completed their college education within eight semesters and one summer session were reasons to believe that no significant differences would appear in the variables compared in this study. However, it was found that the scholastic aptitude, as measured by ACE scores varied considerably. The mean ACE score for Agronomy students was 11.16 points above the average for the other three curriculums. Thus, if ACE scores are valid in predicting college success, Agronomy students would be expected to make considerably better grades while students in Agricultural Education, Agricultural Economics

and Animal Husbandry would be expected to make nearly equal grades.

Analysis revealed however, that Agronomy students did not excel scholastically. They were surpassed by Agricultural Education students and followed by Animal Husbandry and Economics students in that order. Thus, for the curriculums compared in this study the ACE scores failed to predict student's performances.

Other analysis revealed that when all courses were combined and comparisons made among curriculums a highly significant Chi-square value of 36.32 was obtained. But, when the individual courses were analyzed only the courses Written Communications I and II, Elements of Animal Husbandry Lecture and Laboratory and Farm Crops showed significant Chi-square values.

When analyzing the data on the basis of whether or not students offered entrance credit in vocational agriculture it was found that significant differences existed, favoring those who had taken vocational agriculture.

Regardless of whether or not significant differences existed it was found, in most cases, that students who had taken vocational agriculture earned more A's and B's than was expected while those not having vocational agriculture made more C's, D's and F's than was expected. Conclusions were that vocational agriculture trained students were not inferiorly prepared to adequately comprehend the 14 courses included in this study.

Further analysis revealed that the percentage of vocational agricultural students in each curriculum could be used to estimate the scholastic performance of students in college courses.