AN ABSTRACT OF THE THESIS OF

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(Name of Student) (Degree)

in Agricultural Education presented on August 8, 1972
(Major) (Date)

Title: HIGH SCHOOL VERSUS COLLEGE GRADES IN SELECTED COURSES AS AN INDICATION OF ACADEMIC SUCCESS

Redacted for privacy

Abstract approved:

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New pressures and greater demands are on the American educational system. With discoveries made in the development of space materials, other fields of business and industry are offering new positions for qualified persons; however, many of these positions go unfilled.

A new type of agriculturalist is also emerging; studies show that there is a need for two to four agricultural service workers for every one farmer. The closely allied industries of forestry, ornamental horticulture, conservation, and recreation are also developing rapidly. Changes are occurring and employment opportunities are increasing in these areas; yet, many students entering colleges to train for these occupations drop out each year. It is believed that many students could be spared financial loss and disappointment if

more was known about their capabilities before starting college work.

The purpose of the study was to arrive at some findings of the value of using high school grade points in indicating success in the School of Agriculture at Oregon State University. Also to be considered is the relationship of high school size and agriculture department size to college achievement in the selected subjects of biology, chemistry, or agriculture.

The following general comparisons were made: (1) A comparison of high school and college average grades in the selected subjects; (2) high school background compared with college achievement in each of the selected subject areas; (3) grades received in high school and college in the selected subjects with the various high school enrollments of the students; and (4) student achievement in selected college agriculture courses in relation to whether their high school had no agriculture department or a single- or multiple-teacher department.

Only graduates of Oregon high schools who entered Oregon State University during Fall Term of 1970 in the School of Agriculture were considered. The high school subjects studied were biology, chemistry, and vocational agriculture. They were compared with the college courses of: general biology or general botany or general zoology, general chemistry, and an average of three of ten selected introductory agriculture courses that the students took.

The data for the study were obtained from transcripts in the

office of the Dean of Agriculture.

A .60 correlation was found for the over-all comparison of high school and college grades in biology, chemistry, and agriculture. The highest correlation, .65, was for students from schools of 200-499 and 500-999 enrollments.

Only between 28 and 37 percent of those students who achieved 3.00 and above in high school biology and chemistry achieved similarly in college.

Sixty-two and one-half percent of the students who received 3.00 and above in high school agriculture did so in college.

In all three areas, 83 percent of the students under 3.00 in high school were under 3.00 in college.

Between 82 and 97 percent of the students who earned a 2.00 or above grade point in high school did so in college.

Students from high schools of 1000+ enrollment did better in college biology. The correlation between high school and college work was .54.

Students from schools of 200-499 and 500-999 did better in college chemistry. Students from schools of 1000+ did the poorest over-all in college chemistry.

School size appeared to have little relationship to over-all college success in the selected subjects, however.

College achievement in agriculture is greatest among the students from multiple-teacher departments. The correlation was .68.

High School Versus College Grades in Selected Courses as an Indication of Academic Success

by

Wayne Edward Johnson

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Master of Education

June 1973

APPROVED:

Redacted for privacy

Professor of Agricultural Education
in charge of major

Redacted for privacy

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Date thesis is presented August 8, 1972

Typed by Illa W. Atwood for Wayne Edward Johnson

ACKNOWLEDGMENT

The author wishes to express his appreciation to his advisor, Dr. Del Shirley of the Agricultural Education Department, Oregon State University, for taking time from a busy summer schedule to provide guidance for this study.

Grateful acknowledgment is made to the School of Agriculture for having made available the sources of information for this study.

To my beautiful wife, Virginia, goes special acknowledgment for doing my proofreading, giving me encouragement, and praying during the course of this study.

Special appreciation goes to Dr. Phil Davis of the Agricultural Education Department, Oregon State University, who helped get this thesis in its final and finished form.

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HIGH SCHOOL VERSUS COLLEGE GRADES IN SELECTED COURSES AS AN INDICATION OF ACADEMIC SUCCESS

INTRODUCTION

The space age has put new pressures and greater demands upon the American Educational system. It seems that America's goal is to continually stay ahead in the space race and in the Cold War Arms Race also. With discoveries made in development of space materials, other fields of business and industry are offering new positions for qualified persons. Even in agriculture, where the number of farms is decreasing, the number of occupations outside of, and related to, farming is increasing. Yet in these areas, many of the positions are not filled because of the lack of properly trained personnel. Many people wonder why there is this problem if so many people go on to college; yet, they also want to know why many of these do not finish.

Agriculture has undergone extraordinary change in America during the past twenty years. Technological developments and specialization in the production of food and fiber have caused a shift of jobs, once performed on the farm, to off-farm urban areas. Farmers are requiring more services as their operations demand more sophisticated equipment, more complex materials (feeds, seeds, fertilizers, and chemicals). The farm operator is required

to make more advanced management and marketing decisions than ever before. A new type of agriculturist is emerging; as national studies have projected, there is a need for two to four agricultural service workers to every one farmer. These people must be knowledgeable about the farmer's problems as well as about the materials, equipment, and services they provide.

Several closely allied industries are developing rapidly, with similar or the same competencies as production agriculture. These areas are forestry, ornamental horticulture, conservation, and recreation. Tree-farming has gained popularity in Oregon and throughout the United States. Ornamental horticulture is recognized as the second fastest growing industry in Oregon, with nursery, landscaping, and floriculture receiving special recognition. Outdoor recreation's full potential has not yet been determined in Oregon. Occupations in this developing industry are similar to those in production agriculture in terms of skills they require (29:4).

Dynamic changes are occurring in agriculture, and employment opportunities are expanding in a wide variety of related occupations. Yet, many of these positions go unfilled. Many of the entering college students fail or drop out of school. Studies have been conducted to find the reasons why students do not succeed in college. Among these considerations is the possibility that academic success in college could be related to high school education.

The problem of advising students whether to attend college has been with teachers for years. As a high school instructor, the author realizes that counseling is part of the teacher's duties. The instructor and/or counselor must be aware of the influence that grade point achievement and subject background may have in relation to academic success in college. It is believed that many students could be spared financial loss and disappointment if more were known about their abilities and capacities before starting college work.

The challenge of predicting academic success in higher education has been of great interest to, and investigated by researchers and educators alike throughout the years (18:91). Colleges and universities have been interested for many years in developing a method forecasting the scholastic achievement and success of college students. Even with their concern, most of the burden is still on the high school staff with whom the students are in contact.

The author believes the problem should be attacked by analyzing the grades received in high school. By making a comparison of these grades to the ones received in college, it may be determined whether the student has an understanding of the subject. These high school grades could then be used as an indicator of future success in college.

Purpose of Study

The aim of this study is to arrive at some findings of the value of using high school grade points in indicating success in the School of Agriculture at Oregon State University. A major consideration is the relationship of high school size and agriculture department size to college achievement in the selected subjects of biology, chemistry, and agriculture.

The following general comparisons will be made: (see Procedures for a complete description of these)

1. A comparison of high school average grades in biology, chemistry, and agriculture with college average grades in the same subject areas.
2. High school background in each subject area (biology, chemistry, agriculture) compared with college achievement in each area.
3. High school and college grades received in comparison with the enrollments of the high school attended.
4. Students' achievement in selected agriculture courses at college in relation to whether their high school agriculture department was a single- or multiple-teacher department.

This thesis will compare the high school and college grades earned by students enrolling in the School of Agriculture at Oregon State University in the selected courses.

Limitations of Study

Because of the time factor and the nature of the study, the following limitations are imposed in this study:

1. Only students who have been enrolled in the School of Agriculture at Oregon State University for three or more terms will be considered.
2. Only those students entering Oregon State University Fall Term 1970 will be considered in this study.
3. Only those students who graduated from Oregon high schools will be considered.
4. High school subjects to be studied are:
   a. Biology
   b. Chemistry
   c. Vocational agriculture

   These will be compared on a grade-point basis with the following courses offered at Oregon State University:
   a. General Biology (GS 101, 102, 103) or
      General Botany (Bot 201, 202, 203) or
      General Zoology (Z 201, 202, 203)
   b. General Chemistry (Ch 101, 102, 103, or 104, 105, 106, or 201, 202, 203 or 204, 205, 206)
   c. Agriculture courses selected from the following list:

Agriculture Economics (AEc 111)

Wildlife Conservation (Wld 251)

Animal Science (AnS 121)

Animal Science Laboratory (AnS 122)

Selection of Farm Animals (AnS 231)

Mechanical Problems in Agriculture (AET 101, 102)

Agricultural Engineering Survey (AET 211)

Elements of Horticulture (Hrt 111)

Basic Horticulture (Hrt 215, 216)

Poultry Production (P 121)

5. High school students are grouped according to size of school enrollment: under 199, 200-499, 500-999, and 1000+.
6. Vocational agriculture departments of the students are grouped according to the number of teachers in them: (0) no agriculture department, single-teacher, and multiple-teacher.

Definition of Terms

Several terms have been defined in the following paragraphs to give a clearer meaning of what the author is discussing.

1. Vocational Agriculture. A course of study in the high school curriculum with objectives to help the student:
   a. develop the competencies needed to engage in or prepare

to engage in productive agriculture or related occupations,

b. gain a knowledge of career opportunities in agriculture,

c. learn the preparation necessary to enter and progress in agricultural occupations,

d. obtain the ability to secure an acceptable agricultural employment opportunity and to advance in a program of continuing education,

e. cultivate the human relations needed in agricultural occupations, and

f. secure the abilities needed to exercise and follow effective leadership in fulfilling occupational, social, and civic responsibilities (38:135-136).

2. College Grade Point. Grade points are computed on the basis of four points for each term hour of A grade, three points for each term hour of B, two points for each term hour of C, one point for each term hour of D, and 0 points for each term hour of F (31:14).

3. High School Grade Point. Grade points in high school will be determined in the same manner as the college grade point.

4. Grade-Point Average (GPA). The quotient of total points divided by total term hours in which A, B, C, D, and F are received (31:14).

5. Single-Teacher Agriculture Department. This is defined as where only one agriculture instructor is employed in a high school or school district.
6. Multiple-Teacher Agriculture Department. This is defined as where two or more agriculture instructors are employed by a high school or school district.
7. Grade Point Achievement. Earning a grade-point average of 3.00 or higher in any of the selected courses compared on either the high school or college level. The terms achievement, achieved, academic success, scholastic success, and scholastic achievement will be used interchangeably throughout this thesis.

Procedures

Data were obtained from transcripts in the office of the Dean of Agriculture. Grades were taken from college and high school transcripts and compiled on individual data sheets. Only the grades covered in this study were recorded. Both high school and college grade points were computed by the method used by Oregon State University.

High school size was obtained from the 1969-1970 Oregon School Directory. Students were grouped for comparisons according to this information. The number of agriculture teachers was taken from the

Vocational Agriculture Teachers' Directory.

The following comparisons were made:

Over-all GPA

1. Over-all high school and college average grades for all students in the selected subjects of biology, chemistry, and agriculture were compared according to student's high school size.
2. Correlation coefficients were determined for over-all high school and college averages for all students in the selected subjects and according to high school size.

Biology

3. The number of students from each sized school that achieved 3.00 or higher, 2.00 or higher, below 2.00, and failing grades in biology was compared.
4. The number of students achieving versus the number that do not was studied, with comparisons made over-all and by high school size.
5. Total performance of the students was also examined by determining the number of students who received average or above grades and those that did not. Again, they were compared by school size and over-all biology grade point.
6. A comparison of high school and college biology grades was

made, and the correlation coefficient between them was computed by school size and over-all student averages.

Chemistry

7. The number of students from each school that achieved 3.00 or higher, 2.00 or higher, below 2.00, and failing grades in chemistry was compared.
8. The number of students achieving versus the number that do not was studied, with comparisons made over-all and by high school size.
9. Total performance of the students was also examined by determining the number of students who received average or above grades and those who did not. They were compared over-all and by high school size.
10. A comparison of high school and college chemistry grades was made, and the correlation coefficient between them was computed by school size and over-all student averages. A comparison was also made between those students who took high school chemistry and those who did not.

Agriculture

11. The number of students from each school that achieved 3.00 or higher, 2.00 or higher, below 2.00, and failing grades in agriculture was compared.

12. The number of students achieving versus the number that did not was studied. Comparisons were made between those students from a single- and those from a multiple-teacher agriculture department.
13. Total performance of the students in agriculture was also examined by determining the number of students who received average or above grades and those that did not. Comparisons were made over-all and by department size.
14. A comparison of the average number of college agriculture courses taken by students from each sized department was made (0 - no department, single- and multiple-teacher).
15. A comparison of high school and college agriculture grades was made by department size and over-all student average. Correlation coefficients between them were computed. A comparison was made between those students who took high school agriculture and those who did not.
16. The college agriculture achievement of the students was compared to their high school grades in the selected subjects by high school size.

From the comparisons, the following considerations will be made:

1. Achievement in the selected subjects in high school and chances of college achievement.
2. A student's chance of earning average grades.

3. High school background and college achievement in the subject areas.
4. High school size and college achievement.
5. Different-sized agricultural departments and college agriculture achievement.

Recommendations will be made for future study and for using the findings and implications of the study.

REVIEW OF RELATED LITERATURE

In higher education one of the most intensely studied problems is the prediction of academic success. Since before 1920 people have been conducting studies to determine academic success (Hoyt 12:227). Numerous studies have been conducted and will be in the future to help educators gain insight into predicting academic achievement of incoming college students. In this paper, only literature which pertains to the statement of the problem will be presented. Theses have been completed on this subject as recently as 1962. This study will examine material written since then as well as older works.

Odell (27), in a study completed in 1927, noted that with increasing enrollment in secondary and higher education, some basis had to be made for the selection of students. Using almost two thousand freshmen in over one hundred institutions, he examined intelligence tests, college entrance exams, and high school marks as a basis of student selection. He found that the use of this wide a range of students and colleges may have helped lower his results. A fair correlation between high school and college marks and a somewhat lower one on the tests was found. However, the correlation is raised somewhat by combining the best tests and high school grade-point average. Concluding this study, he stated that the use of these measures was better than no criterion at all.

Cumulative grade-point average or percentile rank is the best single indicator of academic success. Loeb (22) also concluded that there is not too much difference in the results if achievement or aptitude tests are used.

In a study similar to Odell's, Marklund (25) looked at the problem of selection for higher education in Sweden. With the school system designed so students would attend some sort of secondary school, a selection process for higher education had to be set up. His problem was compounded by the marking system, which was not consistent from school to school. Swedish teachers were given centrally designed tests to try and standardize the grades. The tests were used by almost every teacher; but, they still were free to take into account their own and the students' differences.

From his study Marklund concluded that:

1. The best instrument for the prediction of academic success in college is marks from the secondary school.
2. The second best indicator is aptitude tests.
3. The combination of marks and aptitude test was even more reliable.

Stansberry's (36) results in his study of Freshmen in Elementary Education at Frostburg State College in Pennsylvania agreed with the Swedish study. High school grades are the best single indicator of college success. In a study at Oregon State College,

Pierson (32) also supported this idea. Presumably the high school grades tapped significant factors not reached by other measures.

Jones (16), in studying 362 seniors who graduated from Oregon State Agricultural College in 1932 and 138 juniors, looked at the problem from a different angle. Examining high school and college marks along with intelligence scores, he concluded that the high school grade-point average was the single best criterion of scholastic success. In addition he stated that a better prediction was gained by using psychological test scores also.

In gathering selectivity data from 2300 colleges, Astin (2) found that grade-point average is the most common factor of admission. He found that the high school grade-point average gives a positive correlation to scholastic success in college. However, the correlation is not perfect since not all students with high marks from high school receive high grades in college. Girls, on the average, obtain higher grades; but the majority of high school students enrolling in college should be prepared to receive lower averages.

Table 1 shows to what extent a student, according to Astin, could predict his success in college. For example, if a boy had an "A" average from high school, he has over a 76 percent chance of achieving at least a "B" average. If this student had a "C", he only has a 10 percent chance of receiving a "B" or better. Boys with an "A" average in high school are more than twice as likely to receive a

Table 1. High school versus college averages (Astin 2:5).

High School Average	Number of Students		Mean GPA		% GPA 2.50 & higher	
	M	W	M	W	M	W
A or A+	1262	1686	2.94	3.08	76	84
A-	2035	2732	2.67	2.83	61	73
B+	3324	3893	2.41	2.59	44	56
B	4247	4174	2.18	2.34	29	37
B-	3121	1982	2.07	2.15	22	24
C+	3094	1644	1.92	2.02	15	15
C	2312	927	1.77	1.83	10	19
D	129	19	1.61	1.73	9	16

"B" or better in college as those with a "B" high school average, and seven times as likely as those with a "C". Campbell (5) in concluding his study found that if a student had a "B" or better in high school, he had a good chance of achieving higher than a "C" in college. However, a "D" average gave a student a 50 percent chance of college scholastic success.

To find a useful way to predict academic success at Oregon State College, a committee (30) of faculty members listed eleven factors of success.

High School Records

1. Grade-Point Average
2. English Points

3. Mathematics Points

4. Science Points

College Placement Tests

5. "Q" Score - A.C.E. Test

6. "L" Score - A.C.E. Test

7. English Test (Mechanics of Expression Score)

8. English Test (Reading) Score

9. Mathematics Test Score

10. National Science Test Score

11. Social Science Test Score

Those students who entered during the fall of 1952 from Oregon high schools were used for this study.

From the data collected the committee examined the frequency with which remedial courses were taken by those who graduated in four years and those who did not. In addition, students who graduated in four years and those who did not were studied to find the differences.

The committee found that the high school grade-point average was the most useful factor in predicting the success of incoming students. No factor or combination of factors gave perfect prediction, although all eleven were useful. They recommended that:

1. If admission was to be by one factor, it should be the high school grade-point average. (Math and English preparation could be considered also.)

2. If a student was denied regular admission, he should be allowed to make up the deficiences and earn the chance to demonstrate his ability.
3. High school students should go to college well prepared in mathematics, science, and English.

"The single best predictor of performance on the college level is the high school academic record" (Lavin 20:57).

Kallingal (17), in a report on Black students at Michigan State University; and a study by Thomas (39), disagreed with that statement. Black student success because of high school background in some cases, restriction due to the selection process, and other factors cannot be predicted on the same scale with white students. Better results are obtained by using academic aptitude and achievement tests as well.

Hoyt (13), Klien (19), and Worthington (42) state that academic success is only one accomplishment. Many other factors, which interact with grades, are important also and should be considered. Among these items are: sex, family income level, age, test scores, future goals, and others.

High school grades have been shown to be a useful and popular predictor of college academic achievement. However, research has also been done to determine exactly how high school educational background influences college scholastic success.

According to Campbell (5), the more academic courses taken by a secondary student, the higher he will achieve in college. He also said that the reverse was true about vocational courses, with lower college achievement resulting from taking more vocational courses in high school.

Hoyt (12) found that many studies indicate that grades in many types of courses are correlated. He found that students who earn high marks in one type of course will do the same in another. The relation is higher only when considering academics such as mathematics, chemistry, English, and history. Grades in special skills such as art, music, shop, and physical education, are less likely to be consistent in other areas. Yet, success in such special skill subjects is in general positively related to academic success. (Factors which tend to make one successful in one course undoubtedly will make one achieve in another course.)

At New Mexico State University, Ashcraft (1:268-270) evaluated the effect of two different types of high school curricula on college achievement. Using high school transcripts and ACT scores, he divided the selected group of students into two groups--"college prep and non-college prep." Students who took seventy-three percent or more college preparatory courses in high school were in the first group, and those taking fifty-nine percent or less were in the second group. He then compared the grades the students had made during

four years in college. When the data were analyzed, they indicated that high school background is not highly critical to college success. General intelligence and non-intelligence factors are more decisive in determining academic achievement. He did find that a longer time factor was involved in achieving success by the "non-college prep" group.

In conclusion Ashcraft (1:271) stated:

> Hopefully we will not stifle interest and creativity in the high school student in one area in order to force him into another. Rather, after careful evaluation and through a process of guidance, let us help him develop into an educationally well-rounded person with a variety of interests.

Certain misconceptions have existed throughout the years concerning agriculture students (10). These misconceptions can be divided into four groups:

1. They are scholastically incompetent.
2. They are physically unpleasant.
3. Agriculture students are less competent in self-expression.
4. They also have less aspiration for training above high school.

Tom (41) reports that between 1929 and 1960 thirty-two studies have been done on the subject of how well former members of vocational agriculture have done scholastically in college. The most common criteria have been:

1. Grades on all college work after four years of college.

2. Grades in all college work after the students took selected high school courses.
3. Grades in different groups of courses.

After analyzing the records of over 17,800 students in twenty states, he found there is little basis for discriminating against vocational agriculture students. His study and Despain's (8) at Utah State University, and O'Kelly's (28), indicate that as a group they do as well as or better than non-vocational students in colleges of agriculture.

Bendixen (3) agrees. He found that former agriculture students do as well, or better, in introductory animal science courses at Iowa State University as non-vocational agriculture students.

Some reliance may be placed on high school records as a predictive index of quality performance in an agriculture college training program, Stuit (37) states. He indicates that those individuals with farm or work experience are superior to those with no training of this sort. According to his study the agriculture curriculum is as satisfactory for college agriculture training as any other school program. Long (23:62), in summarizing his study on the achievement of former vocational agriculture students in college engineering at Oregon State College, says that:

> The Vocational Agriculture students in engineering perform as well as other freshmen in the same curriculum. This conclusion supports other research, such as the Eight Year Study, which propose that it is the quality of scholarship exhibited, not an exposure to certain courses themselves,

> which is a greater influence on achievement in college. To the extent that a high school curriculum meets the functional needs of students and develops individual potential, then to that degree is it meeting well the students' need for college preparation.

Bently (4) suggests that future enrollment in agriculture colleges might decline without benefit of high school agriculture training. In Table 2, he gives data to indicate that vocational agriculture students are more likely to graduate from college on time. His most defensible reason is that they receive the desire in high school agriculture to achieve certain goals which they set up for themselves. A second less defensible reason is that a more persistent student is attracted to vocational agriculture. They want more specialization. According to him, a weak agricultural background might indicate that a student does not have the aptitude to compete.

The high school vocational agriculture program should also be designed for the college-bound student. Emanuel (9) feels that the above average student is discriminated against in present programs.

Table 2. High school vocational agriculture and college achievement (Bently, 4).

Years of Vo-Ag in High School	Percentage of Students Graduating on Time
None	27
One	26
Two	36
Three	45
Four	45

With more occupational opportunities available now, these students should be made aware of them also. The agriculture program is also for the college bound; they need to be aware of the opportunities.

With background of prospective college students being considered important, the question of the high school's ability to provide it has been raised. Many studies have been conducted to examine the relationship between high school size and students' achievement in college.

Jones (16), in summarizing his study of 362 seniors who graduated from Oregon State Agricultural College in 1932, concluded that size of Oregon high schools bears little relation to student success. However, students from larger schools came closer to their predicted college averages.

In a similar project, Tingley (40) stated that larger high schools turn out superior students. However at that time, 1932, more than fifty percent of Oregon's high schools had an enrollment of less than fifty pupils. Size does influence the chance for success; but has no direct relation to grades or intelligence.

Hoyt (14) in a review of literature on the achievement of students from different size schools summarized them in the following manner:

1. Ability to do college work (five studies).

   Two studies claimed there was no difference among schools.

Three studies favored pupils from larger schools.

2. Performance in college (seventeen studies).

   Five showed no difference in schools.

   Six favored students from larger schools.

   Three favored pupils from small schools.

   Three favored medium size schools.

In studying the entering freshmen class of 1956 at Kansas State College, he divided them according to size of high school graduating class. His results showed that:

1. The difference in potential is no larger than by chance.
2. First year grades are at about the same level.
3. Students' grades from smaller schools tend to be over predicted.

Institutional differences may account for inconsistencies from earlier work. Campbell (5) said that students from graduating classes of 200-399 had the greatest chance of success.

Using Arkansas high schools, Smith (35) concludes that there is some relationship between high school size and achievement in college. Students from high schools of 400 or more achieve significantly higher total educational levels than ones from smaller high schools. In individual subjects they achieve higher in social studies and English. Highest mathematics and science achievement comes

from high schools of 600 or more. He concluded that high schools should have a minimum of 500 students for best achievement.

Some authorities believe that only large schools are able to offer effective and comprehensive educational programs at reasonable cost. Others say school size is not a valid indicator of school quality, Jackson (15). Heesacker (11) agrees with this by saying, "A small school can be a good school." Many exemplary programs are being devised by rural educators. These practices are ones that are helping youth achieve.

Jackson (15), in studying the problem of school size, looked at the entire Southern Region. (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia). Conducted during the 1962-1963 school year his project includes a total of 4,773 public senior high schools (has a twelfth grade) with a total enrollment of 2,318, 449. He divided the high schools into the following groups (Table 3).

Table 3. Jackson's breakdown of schools by enrollment.

Group	Total Enrollment
I	99 or less
II	100-249
III	250-499
IV	500-999
V	1000-1499
VI	1500-1999
VII	2000 or more

He found the relatively small schools inferior. This was especially evident below an enrollment of 500 in all factors except Teaching Experience. In terms of number of subjects offered, number of courses offered per subject area, and total number of courses offered, the curriculums of schools above 500 pupils were broader and more enriched. Providing adequate learning experience is the focal point of a broad program of course offerings. Jackson also found that the teachers were better trained in the larger schools.

According to Cashen (6) it has been shown by studies, that by holding measured intelligence constant for two groups, high school size is not important in the upper one-third of the graduating classes. However, those students in the lower one-third of their class from larger schools (1500 and up) tend to be more successful than counterparts from medium (501-1500) and small high schools. In concluding her own study, Cashen showed that if the ACT is held constant, the size of the high school does make a difference. Small schools will fare as well as or better than large schools. However, she felt that the medium-size schools (around 500 or larger enrollment) were superior. Two explanations are possible she says:

1. The study was at a medium-sized university (Illinois State), so these students may have had no change in atmosphere from high school to college. Hence, they had no adjustment problems.

2. Perhaps, the advantages of both the small and large school are reflected in a medium-size school.

The school size issue will probably continue to be debated in studies for years to come; whether it is adapted for differences in aptitude or achievement as Linquist (21) did or some other means are used. It would seem though that the medium-sized school is emerging as a favorite. Now, a question may come up about the size of a particular department in a school, which one is the best size.

In agriculture there are the single-teacher departments and multiple-teacher departments (two or more men). Not much research has been done on the subject of which is best. Logic may favor a multiple-teacher department, since it could take advantage of the expertise of each man. For example, this could compare favorably with a larger school giving more course offerings in English.

In a study of single- and multiple-teacher departments in Kansas, Marrs (26) looked at one area--Leadership Development. He conducted his research over a three-year period and found that the multiple-teacher department was superior in the following areas: They had

78% of the State and American Farmers

89% of the Foundation Awards

73% of the District and State Officers

73% of the Public Speaking Winners

They also won:

76% of the Judging Team Awards

80% of the Individual Judging Awards

100% of the Chapter Safety Awards

67% of the Scholarships

85% of the Co-op Activities Awards

64% of the National Chapter Awards

and they also had ten more Chapter Rating Awards. Viewing their dominance in this area, it could give some indication of superiority in other areas.

Crews' (7), Lyda's (24) and Schmidt's (33) studies perhaps could best summarize the results in the four areas just covered.

1. High school achievement as compared to college academic success.
2. Course background in high school versus college success in the same areas.
3. Size of the high school and its affect on achievement in college.
4. Size of the agriculture department and students' achievement in agriculture in college.

All of these studies compared selected factors (courses, school size, background, etc.) to achievement in college. Conclusions reached from their studies were:

1. Schmidt (33:64) found that only a small percentage of the high school students who achieved (3.00 or above) in mathematics, chemistry, English, biology and general science went on to achieve in the same areas in college. His study indicated that this percentage was 25 to 38. Lyda (24:55) found this to be between 35 and 40 percent.
2. Both gave very little chance to succeed to students who did not achieve in high school. Lyda (24:55) put the percentage of those that did at 4 to 28 percent. Schmidt (33:65) indicated it was between 9 and 33 percent.
3. Schmidt (33:65) found that between 72 and 83 percent of the students who did average or above (2.00 or higher) in high school mathematics, English, chemistry, biology, and general science went on to do average or above in college. Lyda's (24:55) paper gave a little wider range of 61 to 83 percent.
4. Below average students had a 50 percent chance to do average or above in Schmidt's study (33:65) while Lyda found that two-thirds of his below average students did average or above. However, Lyda (24:55-56) said only 9 percent of the below average students did above average in college English.
5. Schmidt (33:65-66) found that over-all high school decile

rating was one of the most accurate factors in predicting college academic achievement. Achievement and a decile rating in the upper ranks were found to be closely related. Crews (7:171) also found that the high school decile was the best single available predictor. However, he said that in counseling, all available data should be used--not just one single factor.

6. High school preparation or background had very little influence on the performance of students in the subject of chemistry according to Schmidt (33:66-67). There was no significant difference in the performance of those who did, and those who did not, take high school chemistry. Almost all of the high school students took the other subjects (mathematics, biology, and English) so it could not be determined whether high school background was a significant influence or not.
7. Table 4 summarizes the results from Lyda's (24) study on the difference between high school and college grade point (over-all, and in the selected subjects of mathematics, English, chemistry, biology, and general science).

Lyda (24:57) concluded that school size has little to do with success in college. He found that the small school (under 200 enrollment) gave its students higher grades.

Table 4. High school versus college grade point (Lyda 24:56-57).

High School Size	Over-all Grade Point Drop	Drop in Selected Courses
Under 200	.72	.76
200-499	.46	.27
500-999	.58	.49
Over 1000	.43	.47

The results from this study should approximate those received in the ones just reviewed. However, the question of the effect of different size agriculture departments has not been resolved.

FINDINGS

The college scholastic performance of the incoming freshman class of 1970 was studied using the comparisons outlined in Chapter I. Each selected subject (biology, chemistry, and agriculture) was organized into tables in the following categories: over-all high school and college achievement in the subjects; comparison of students who achieved in high school and college in each subject; a comparison between students who achieved in high school and those who did not in college in each subject; a comparison of students who did not achieve in high school and did in college in each subject; and a comparison of students who did not achieve in high school or college in each subject. An over-all comparison is made between the size of the student's high school and scholastic achievement in college. Individual comparisons were made for biology and chemistry also.

For comparison, the students were placed in one of four groups, according to high school enrollment: under 199, 200-499, 500-999, and 1000+.

Correlations were computed for those parts of the study outlined in Chapter I--Procedures. The Spearman Rank Correlation method was used in the study (34:202-213).

Consideration of agriculture department size is made in relation to high school versus college achievement in agriculture. The

size of departments is compared in three groups: (0) no agriculture department or did not take high school agriculture when offered, single-teacher, and multiple-teacher departments.

Over-all Grade Points Compared

The over-all high school grade point, in the selected courses, for the students was 2.99 compared to a college average of 2.49. This represents a drop of .50 between high school and college grade point averages.

Students from schools of 1000+ enrollment had the highest high school average, 3.09, and the lowest college average, 2.40. This represents a drop of .69 in grade point between high school and college in the selected subjects. The students from schools of 500-999 enrollment had the lowest high school average, 2.92, but had the highest college record with an average of 2.64, a drop of only .28. The high school average of students from schools of 200-499 was 3.01, and it dropped .60 to a college average of 2.41. The records of students from the smallest schools were second, with a drop of only .47 between high school and college.

Table 5 summarizes the material presented in the two previous paragraphs. In addition, it presents the correlation coefficients for the four groups and over-all. The two groups of 200-499 and 500-999 had the highest correlation between high school and college averages in the selected subjects, .65. The over-all coefficient was

Table 5. Comparison of over-all high school and college averages by high school size.

	School Size				Total
	199	200-499	500-999	1000+	
Total students studied	9	12	18	11	50
High school grade point	2.99	3.01	2.92	3.09	2.99
College grade point	2.52	2.41	2.64	2.40	2.49
Difference	.47	.60	.28	.69	.50
Correlation coefficient	.58	.65	.65	.45	.60

.60 for the students included in the study. From the data presented, grades from medium-sized schools appear to be better predictors of success than those from small or large schools.

Performance of Biology Students

Over-all Considerations

The general topic considered for the biology students in Table 6 is self-explanatory. It should be mentioned that when the author says a student has taken college biology that one of the following sequences has been taken: General Biology, or General Botany, or General Zoology; refer to Chapter I--Limitations. Only one student did not take high school biology, but nine did not take college biology.

The data in Table 6 indicate that students from schools of

Table 6. Grade point comparisons of high school and college biology by school size.

	School Size				Total
	199	200-499	500-999	1000+	
Total students studied	9	12	18	11	50
Total high school biology students	9	12	18	10	49
High school biology students 3.00 and above	7	8	12	7	34
High school biology students below 3.00	2	4	6	3	15
High school biology students 2.00 and above	9	12	18	10	49
High school biology students below 2.00	0	0	0	0	0
Total college biology students	9	9	16	7	41
College biology students 3.00 and above	2	1	3	4	10
College biology students below 3.00	7	8	13	3	31
College biology students 2.00 and above	8	7	14	6	35
College biology students below 2.00	1	2	2	1	6
Number of college students who failed biology	0	0	0	0	0

1000+ do better in college biology than students from the other three groups of high schools.

In Table 7 a comparison is shown between those students who achieved in high school biology and those who achieved in college biology. Out of 50 students studied, 41 took both high school and college biology. Of the 29 students who achieved a 3.00 or higher average in high school, only 8 or 28 percent achieved that average in college. A higher proportion of students from schools of 1000+ appear in this category than do students from the other three groups.

Twenty-one of the students did not do as well in college as they did in high school biology; however, two did better in college than in high school.

Table 7. A comparison of students achieving in both high school and college biology.

	School Size				Total
	199	200-499	500-999	1000+	
High school biology 3.00 and over, college biology 3.00 and over	2	1	2	3	8
High school biology 3.00 and over, college biology under 3.00	5	5	9	2	21
High school biology under 3.00, college biology 3.00 and over	0	0	1	1	2
High school biology under 3.00, college biology under 3.00	2	3	4	1	10
Total comparisons	9	9	16	7	41

Table 8 shows the total performance of those students who took high school and college biology, and compares them by high school size. Also from the table can be gained a comparison of those students who did average or above (2.00 and over) in high school and their performance in college, by high school size.

Table 8. Total performance of high school and college biology students.

	School Size				Total
	199	200-499	500-999	1000+	
High school biology 2.00 and over, college 2.00 and over	8	7	14	6	35
High school biology 2.00 and over, college under 2.00	1	2	2	1	6
High school biology under 2.00, college 2.00 and over	0	0	0	0	0
High school biology under 2.00, college under 2.00	0	0	0	0	0
Total comparisons	9	9	16	7	41

According to the table, 85 percent of those students who earned average or above grades in high school, received average or above in college. Six of the students, almost 15 percent received under a 2.00 average in college after receiving a 2.00 or over average in high school.

Only one student did not take high school biology, and at the time of the study had taken no college biology. No comparison could be made between high school biology background and achievement in college biology for this student.

In Table 9 the comparison is between the high school and college grade points of the four groups of students. Over-all their average dropped .66 of a grade point between high school and college. Students from schools of 1000 and over experienced the least drop in grade point, .10, with a 3.03 high school and 2.93 college average. Group III students (500-999) had a high school biology average of 2.93 and it dropped .42 of a grade point to 2.51 in college. Students

Table 9. A comparison of high school and college biology grade point averages.

	School Size				Total
	199	200-499	500-999	1000+	
Number of students taking high school and college biology	9	9	16	7	41
High school biology grade-point average	3.19	2.96	2.93	3.03	3.01
College biology grade-point average	2.46	2.19	2.51	2.93	2.35
Difference	.73	.77	.42	.10	.66
Correlation coefficient	.49	.39	.30	.54	.34

from the smallest two groups did not do as well: students from schools of 200-499 fell .77 from a 2.96 to 2.19 in college, and students from schools under 199 enrollment fell from 3.19 to 2.46, a drop of .73. Students from schools of over 1000 appear the best prepared to take college biology.

Not only did the schools of 1000+ enrollment have the highest college biology grade point, but also the highest correlation: .54, between their high school and college grades in the subject. Overall, the correlation was only .34, and schools of 500-999 had the lowest correlation of .30.

Summary of Biology

1. Twenty-eight percent of those students who scored 3.00 and above in high school biology did the same in college.
2. Eighty-three percent of the students who earned below 3.00 in high school did so in college.
3. Eighty-five percent of the students who earned average or above grades in high school earned average or above grades in college.
4. No comparison between lack of high school biology background and college achievement could be made.
5. The over-all correlation coefficient between high school and college biology for all students was .34.

6. The least difference between high school and college biology grades was with students from schools of 1000 or over. They also showed the highest correlation of .54 between high school and college biology grade-point averages.
7. Students from schools of 200-499 enrollment showed the greatest difference in high school and college biology grades, and a correlation coefficient of .39.
8. Students from schools of 500-999 had the least amount of correlation, .30, between high school and college biology.

Performance of Chemistry Students

Over-all Considerations

As presented in Table 10, 47 students took high school chemistry and 45 took college chemistry. The rest of the information included in the table should be self-explanatory.

Of the group, students from schools of 1000+ appear to have the poorest grades for college chemistry.

A comparison between high school and college chemistry is shown in Table 11. Only 42 students out of the 50 studied took both high school and college chemistry. Of the 19 students who achieved a 3.00 or higher average in high school, 7 or 37 percent received a 3.00 or higher in college.

Table 10. Comparison of high school and college chemistry grade points by school size.

	School Size				Total
	199	200-499	500-999	1000+	
Total students studied	9	12	18	11	50
High school chemistry students	9	11	17	10	47
Students 3.00 and over	6	2	7	5	20
Students below 3.00	3	9	10	5	27
Students 2.00 and above	9	10	15	10	44
Students below 2.00	0	1	2	0	3
College chemistry students	8	10	17	10	45
Students 3.00 and over	2	3	4	0	9
Students below 3.00	6	7	13	10	36
Students 2.00 and over	7	8	15	5	35
Students below 2.00	1	2	2	5	10

Two of the students received a grade point higher in college than what they received in high school. The table reveals that 91 percent of the students who were under 3.00 in high school were under 3.00 in college also.

Table 11. A comparison of students who achieved in high school and college chemistry.

	School Size				Total
	199	200-499	500-999	1000+	
High school chemistry 3.00 and over, college chemistry 3.00 and over	2	2	3	0	7
High school chemistry 3.00 and over, college chemistry under 3.00	3	0	4	5	12
High school chemistry under 3.00, college chemistry 3.00 and over	0	1	1	0	2
High school chemistry under 3.00, college chemistry under 3.00	3	6	8	4	21
Total comparisons	8	9	16	9	42

In Table 12 the total performance of those students who took high school and college chemistry is listed by size of high school. The table also shows the performance in college of those students who did average or above work in high school chemistry.

Of those students who earned average (2.00) or above grades in high school, 82 percent received average or above in college. Two students achieved under a 2.00 in high school and college chemistry. In general for the students, high school background in chemistry appears to be adequate for earning average or above grades in college.

Table 12. Total performance of high school and college chemistry students.

	School Size				Total
	199	200-499	500-999	1000+	
High school chemistry 2.00 and over, college chemistry 2.00 and over	7	7	14	5	33
High school chemistry 2.00 and over, college chemistry under 2.00	1	1	1	4	7
High school chemistry under 2.00, college chemistry 2.00 and over	0	0	0	0	0
High school chemistry under 2.00, college chemistry under 2.00	0	1	1	0	2
Total comparisons	8	9	16	9	42

Table 13 compares the high school and college grade-point averages of the four groups of students in chemistry. Also included is the college chemistry average of those students with no high school background in the subject. The over-all college chemistry grade point of those students having high school chemistry is 2.22, representing a drop of .39 from high school. Students from schools of 1000 and above experienced the greatest drop 1.11, over one grade point, from 2.83 to 1.72. Experiencing the least decline in grade-point average, .07, were the students from high schools of 500-999.

Table 13. A comparison of high school and college chemistry grade points.

	School Size				Total
	199	200-499	500-999	1000+	
Number of students taking only college chemistry	0	1	1	1	3
Grade-point average	-	2.38	2.33	1.00	1.90
Students taking high school and college chemistry	8	9	16	9	42
High school chemistry grade-point average	2.78	2.50	2.47	2.83	2.61
College chemistry grade-point average	2.33	2.32	2.40	1.72	2.22
Difference	.45	.18	.07	1.11	.39
Correlation coefficient	.51	.55	.46	-.41	.31

They fell from a 2.47 to a 2.40. The high school average, 2.50, of students from schools of 200-499 fell .18 to a 2.32 in college. Students from the smallest schools, under 199 enrollment, fell .45 from 2.78 in high school to 2.33 in college. By way of contrast, students with no high school chemistry background earned a college chemistry grade-point average of 1.90. However, there were only three of these students.

Students from schools of 500-999 appear to be the best prepared

in chemistry, at least according to differences in grade point. The correlation coefficient for that group is .46. Group II (200-499) has the highest correlation between high school and college chemistry, .55. The over-all coefficient for the group is .31; but, the 1000+ schools have a negative coefficient of -.41.

Summary of Chemistry

1. Thirty-seven percent of those students who achieved a 3.00 or higher average in high school did so in college.
2. Ninety-one percent of the students who were under 3.00 in high school were under 3.00 in college.
3. Eighty-two percent of the students who earned average or above grades in high school did so in college.
4. Three students did not take high school chemistry, but took college chemistry. They received an average grade point of 1.90.
5. The over-all correlation coefficient for all students' high school and college chemistry grade-point average was .31.
6. Students from schools of 500-999 experienced the least difference in high school and college grade points, but had a correlation coefficient of .46.
7. The greatest difference in high school and college chemistry grade-point average was shown by students from schools of

over 1000, with a correlation coefficient of -.41 and a grade point drop of 1.11.

Performance of Agriculture Students

Of the 50 students studied, 26 had taken high school agriculture. The college agriculture courses from which the students' grades were taken are found listed in Chapter I. These courses are introductory in nature and so should be uniform in depth of material covered.

Twenty-four of the students did not take high school agriculture. Of these 17 did not have agriculture programs in their high schools, and 7 did not take it although it was offered in their schools.

In this portion of the study, comparisons will be made between size of high school and achievement in agriculture. However, the main emphasis will be on agriculture background and student success, and on the relation of size of agriculture department (number of men) to college agriculture academic success.

Table 14 gives a comparison of high school and college agriculture academic achievement in relation to high school size. Students from medium sized high schools (500-999) appear to receive the highest grades in college agriculture.

For the following portion of the study the students were divided into three groups: (0) no high school agriculture department or did

Table 14. A comparison of high school and college agriculture achievement by school size.

	School Size				Total
	199	200-499	500-999	1000+	
Total students studied	9	12	18	11	50
High school agriculture students	2	8	12	4	26
Students 3.00 and over	1	8	11	4	24
Students below 3.00	1	0	1	0	2
Students 2.00 and over	2	8	12	4	26
Students below 2.00	0	0	0	0	0
College agriculture students	9	12	18	11	50
Students 3.00 and above	4	5	12	7	28
Students below 3.00	5	7	6	4	22
Students 2.00 and above	9	12	17	10	48
Students below 2.00	0	0	1	1	2

not take agriculture, single-teacher department, multiple-teacher department.

A comparison between high school and college agriculture is shown in Table 15 for single and multiple-teacher departments. Only 26 of the 50 students studied took both high school and college agriculture. Fifteen or 62.5 percent of the students who received a 3.00 or

Table 15. A comparison of students who achieved in high school and college agriculture by department size.

	Department Size			Total
	0	Single	Multiple	
High school agriculture 3.00 and over, college agriculture 3.00 and over	-	7	8	15
High school agriculture 3.00 and over, college agriculture under 3.00	-	6	3	9
High school agriculture under 3.00, college agriculture 3.00 and over	-	0	0	0
High school agriculture under 3.00, college agriculture under 3.00	-	1	1	2
Total comparisons	-	14	12	26

higher grade point in high school received a 3.00 or higher in college in agriculture.

The table reveals that all of the students who were under 3.00 in high school were under 3.00 in college. Only two of the students were in this category however. According to the data, the highest proportion of students who achieve in college agriculture, come from multiple-teacher departments.

Table 16 shows the college performance of those students who did average (2.00) or above in high school. Also the total

Table 16. Total performance of high school and college agriculture students.

	Department Size			Total
	0	Single	Multiple	
High school agriculture 2.00 and over, college agriculture 2.00 and over	-	14	11	25
High school agriculture 2.00 and over, college under 2.00	-	0	1	1
High school agriculture under 2.00, college 2.00 and over	-	0	0	0
High school agriculture under 2.00, college under 2.00	-	0	0	0
Total comparisons	-	14	12	26

performance of those students who took both high school and college agriculture is shown.

The table shows that 96 percent of the students who earned a 2.00 and above grade-point average in high school did the same in college. Only one student scored under a 2.00 average in college agriculture work, in this comparison.

One more comparison is made before examining high school background and college agriculture success. Table 17 lists the average number of college agriculture courses taken by each of the three groups of students. There is no significant difference shown

Table 17. A comparison of the average number of college agriculture courses taken by department size.

	Department Size			Total
	0	Single	Multiple	
Number of college agriculture students	24	14	12	50
Total number of agriculture courses taken	76	45	33	154
Average number of agriculture courses taken per student	3.17	3.21	2.75	3.08

in the number of college agriculture courses completed by the three groups of students.

In Table 18 the high school and college grade points of the three groups of students in agriculture are compared. The college agriculture average of those students with no high school background is included. The over-all college grade point of those students having high school agriculture is 2.92. This represents a drop of .68 from a high school average of 3.60. Students from a multiple-teacher department had the highest college average of 2.99. This was a total drop of .57 from their high school average of 3.56. They also had the highest correlation coefficient of .68. The over-all coefficient was .45 for those students who took both high school and college agriculture. The students from a single-teacher department dropped .78

Table 18. A comparison of high school and college agriculture grade-point averages.

	School Size			Total
	0	Single	Multiple	
Number of students taking only college agriculture	24	-	-	24
Grade-point average	2.76	-	-	2.76
Number of students taking high school and college agriculture	-	14	12	26
High school agriculture grade point	-	3.64	3.56	3.60
College agriculture grade point	-	2.86	2.99	2.92
Difference	-	.78	.57	.68
Correlation coefficient	-	.45	.68	.45

from a 3.64 in high school to a 2.86 in college. This was a higher average than the students with no high school agriculture background at all. Their average was a 2.76 for their agriculture course work at college.

Summary of Agriculture

1. Only 26 students out of 50 studied took high school agriculture.
2. Sixty-two and one-half percent of those students achieving

3.00 or higher in high school agriculture did so in college.

3. All of the students who were under 3.00 in high school were under 3.00 in college.
4. Ninety-six percent of the students who earned average (2.00) or above grades in high school did so in college.
5. The average number of college agriculture courses taken at the time of the study was three (3.08).
6. Students from multiple-teacher agriculture departments had the highest college agriculture grade-point average and had the least amount of difference between high school and college agriculture grade point. Their correlation coefficient was the highest also, .68.
7. Those students with no high school agriculture background had the lowest college agriculture grade-point average.

High School Grade Point and College Agriculture Achievement

Table 19 is a comparison between high school grade point in the selected subjects (biology, chemistry, and agriculture) and college achievement in agriculture course work. Only 24 of the students took all three courses in high school. Twenty-two of the remaining 26 took chemistry and biology only.

The following is a summary of the results of Table 19:

Table 19. College agriculture achievement versus high school grade point in the selected subjects by high school size.

		School Size				Total
		199	200-499	500-999	1000+	
I.	Number of students studied	9	12	18	11	50
II.	Number of students taking high school biology, chemistry, agriculture	2	7	11	4	24
	High school grade point	2.86	3.10	2.99	3.30	3.06
	College agriculture	2.27	2.81	2.92	3.21	2.88
III.	Number of students in high school biology and agriculture only	0	1	1	0	2
	High school grade point	-	2.59	3.42	-	3.00
	College agriculture	-	2.75	3.45	-	3.10
IV.	Number of students in high school chemistry and agriculture only	0	0	0	0	0
V.	Number of students in high school biology and chemistry only	7	4	6	5	22
	High school grade point	3.05	2.89	2.63	3.05	2.90
	College agriculture	2.89	2.36	2.93	3.06	2.84
VI.	Number of students in high school biology only	0	0	0	1	1
	High school grade point	-	-	-	2.00	2.00
	College agriculture	-	-	-	2.29	2.29
VII.	Number of students in high school chemistry only	-	-	-	1	1
	High school grade point	-	-	-	2.00	2.00
	College agriculture	-	-	-	1.36	1.36

1. Twenty-four students took high school biology, chemistry, and agriculture.
2. Students from schools of over 1000 enrollment showed the highest college agriculture grade point in relation to high school average. These students as a group showed a higher over-all college agriculture average than those students who took just high school biology and chemistry.
3. Only two students took only high school biology and agriculture. They showed the highest over-all college agriculture achievement.
4. There were no students who took just high school chemistry and agriculture.
5. Of the students who took just chemistry and biology in high school, the students from schools of 1000+ enrollment achieved the highest academic average in college agriculture. Twenty-two students were in this category.
6. Students taking either biology or chemistry only in high school were the lowest achievers in college agriculture. However, there was only one student in each category, so the results are not significant.
7. The best background for college agriculture appears to be a combination of high school biology and agriculture, with chemistry as an optional course. (At least for the courses examined in preparing this study.)

SUMMARY

The space age, related technological developments, and advancements in business and industry have caused many of our occupational requirements to become exceedingly complex. New developments and specialization in the production of food and fiber alone have opened up many new, but more intricate jobs. The pressures to obtain higher educational training have multiplied greatly in the last few years. A thorough understanding of a student's ability has to be foremost in the mind of the person or persons giving the student counseling or advice about this advanced training.

Many studies in the past have concentrated upon predicting a student's academic success in college. In the majority of the papers reviewed by the author, the single most reliable predictor of scholastic achievement was high school grade point.

The purpose of this study was to make a comparison of the high school and college grade-point averages, in selected courses, of the 1970 incoming freshman class in the School of Agriculture at Oregon State University. This study was limited to 50 students who had graduated from Oregon high schools.

The primary objectives were to compare high school and college grades in the selected subject areas of biology, chemistry, and agriculture; the effect of high school preparation and college

scholastic achievement in these areas; to compare the grades received by students from various sized high schools; and to compare the grades received in agriculture by students from various sized high school agriculture departments. Correlation coefficients were also computed for each area in relation to over-all student performance and in relation to school or agriculture department size.

Findings and Implications

The implications drawn from the comparisons made in this study were:

1. Over-all a correlation exists for comparison of high school and college grades in the subjects of biology, chemistry, and agriculture. The study found it to be .60. The best correlations exist for students from schools of 200-499 enrollment and 500-999, both had coefficients of .65.
2. Only a low percentage of those students who earned a 3.00 and above in high school subjects of biology and chemistry go on to achieve in college in these subjects. As indicated by the study, between 28 and 37 percent do.
3. Achievement in high school agriculture appears to indicate a good chance of success in college agriculture. Of the students who received a 3.00 or higher in high school, 62.5 percent did so in college.

4. In all three areas, if a student was under 3.00 in high school, he would probably be under 3.00 in college also. The study indicates that the percentage is over 83.
5. Students achieving average or above grades in high school biology, chemistry, and agriculture have a good chance to do so in college. Between 82 and 97 percent of the students earned a 2.00 or above grade point in college.
6. No comparison could be made between lack of high school background and college achievement in biology. However, in chemistry and agriculture a student with no high school background in the subject could expect to receive between .16 and .32 of a grade point lower average than students with the background.
7. Students from high schools of 1000+ enrollment or more are the best prepared in biology, according to the study. The correlation coefficient for their high school and college work was .54.
8. As far as difference in grade-point averages in chemistry, the study favored students from the 500-999 sized high schools. However, the correlation coefficient for schools of 200-499 was higher at .55 and the difference in their high school and college chemistry was only .18; so for the two groups, 200-499 and 500-999, they were about equal

considering both factors.

9. The students from high schools of 1000+ enrollment were not well prepared in chemistry. They experienced a grade point drop of 1.11 between high school and college, and their correlation coefficient was negative, -.41.
10. As indicated by the findings, school size appears to have little to do with college success, over-all.
11. College achievement in agriculture is greatest among the students from a multiple-teacher department. They also had the highest correlation between high school and college grades of any of the selected subjects, .68.
12. A basic biology, agriculture background with or without chemistry is the best preparation for college agriculture, according to the results from Table 19 in the study.

Recommendations

The following recommendations are based on the conclusions made in this study:

1. Colleges should still use high school grade-point average as one means of college student selection.
2. All teachers and counselors should prepare students for the initial shock of receiving lower grades in college than in high school.

3. Teachers should challenge the students more, to prepare them for the more competitive college situation.
4. Other studies should look into the chemistry preparation of students from schools of 1000+ enrollment. Theoretically, they should have one of the best backgrounds in chemistry. However, as seen in the results of this study, the group studied did not.
5. Agriculture teachers in a single-teacher department should also challenge their college-bound students more. They should help them develop a broader background which they can use to compete with in college. The difference between them and the multiple-teacher departments was not as great as the author expected.
6. Counselors and teachers should be aware of each student's scholastic abilities well in advance of the student's entrance into college. They should help these students strengthen weak areas and prepare for college.
7. Further study should be made on the question of why students who enrolled in the School of Agriculture did not take agriculture in their high school, if it was offered.
8. A study, on the nature of this one, using several incoming freshmen classes should be made. Perhaps it could shed more light on student success in agriculture, especially comparing agriculture department sizes.

BIBLIOGRAPHY

1. Ashcraft, Rock. High school preparation and college achievement. School Counselor Vol. 16 No. 4:268-271. March 1969.

2. Astin, Alexander W. Predicting academic performance in college; selectivity data for 2300 American colleges. New York, Free Press, 1971. 299p.

3. Bendixen, Joe Francis. Relation of high school vocational agriculture to achievement in college courses in animal science. Master's thesis. Ames, Iowa State University, 1963. 83 numb. leaves (Microfiche)

4. Bently, Ralph and John P. Strouse. Achievement in college and vocational agriculture. Agricultural Education Magazine Vol. 4 No. 2:42-43. August 1969.

5. Campbell, Joe Watkins. Factors related to scholastic achievement (Louisiana State University's 1963-1964 Freshman class). Doctoral dissertation. Louisiana State University, 1966. (Dissertation Abstracts Vol. 26 pt. 7:4360-4361. 1966)

6. Cashen, Valjean M. High school size as a factor in college academic success. Journal of Secondary Education 45:256-259. October 1970.

7. Crews, Graydon Talmadge. Selected factors in relation to college success for science majors at Oregon State College. Doctoral dissertation. Corvallis, Oregon State College, 1957. 193 numb. leaves.

8. Despain, Ted Allen. A comparison of college grades of former students and non-students of high school vocational agriculture. Master's thesis. Logan, Utah State University, 1970. 36 numb. leaves. (Microfiche)

9. Emanuel, Bruce W. Vocational agriculture for college-bound students. Agricultural Education Magazine 43:93+. October 1970.

10. Haynes, Robert L. Misconceptions concerning vo-ag students. Agricultural Education Magazine Vol. 43 No. 8:200. February 1971.

11. Heesacker, Frank L. The small school can be a good school. National Association of Secondary School Principals Bulletin Vol. 54 No. 348:1-4. October 1970.

12. Hoyt, Donald P. College student: predictions of college success. In: The Encyclopedia of Education. Volume 2. New York, Macmillan, 1971. p. 227-232.

13. Hoyt, Donald P. Generalized academic prediction in four-year colleges. Personnel and Guidance Journal 47:136. October 1968.

14. Hoyt, Donald P. Size of high school and college grades. Personnel and Guidance Journal 6:569-573. April 1959.

15. Jackson, Joe L. School size and program quality in Southern high schools. Nashville, Center for Southern Education Studies, George Peabody College for Teachers, 1966. 58 p.

16. Jones, George A. A. The prediction of scholastic success at Oregon State Agricultural Colleges. Master's thesis. Corvallis, Oregon State Agricultural College, 1933. 170 numb. leaves.

17. Kallingal, Anthony. The prediction of grades for Black and White students at Michigan State University. Journal of Educational Measurement Vol. 8 No. 4:263-265.

18. Keenen, C. B. and J. E. Holmes. Predicting graduation withdrawal and failure in college by multiple discriminant analysis. Journal of Educational Measurement &;91-95. Summer 1970.

19. Klein, Ruth B. and Fred A. Snyder. Non-academic characteristics and academic achievement. Journal of College Student Personnel Vol. 10 No. 5:328-331. September 1969.

20. Lavin, David E. The prediction of academic performance. New York, Russell Sage Foundation, 1965. 182 p.

21. Lindquist, Everet F. An evaluation of a technique for scaling high school grades to improve prediction of college success. Educational and Psychological Measurement 23:623-646. Winter 1963.

22. Loeb, J. W. and D. E. Mueller. Use of a scale of high schools in predicting college grades. Educational and Psychological Measurement 30:381-386. Summer 1970.

23. Long, James S. Scholastic achievement of high school vocational agriculture students in college engineering curriculum. Master's thesis. Corvallis, Oregon State College, 1958. 66 numb. leaves.

24. Lyda, Harry Lee. A comparison of high school and college grades. Master's thesis. Corvallis, Oregon State University, 1967. 62 numb. leaves.

25. Marklund, Sixten. Predictive value of school marks and tests for higher education in Sweden. World Year Book of Education, 1969. pp. 79-94.

26. Marrs, Dan Ralph. A comparison of single teacher and multiple-teacher vocational agriculture departments in the area of leadership development. Master's thesis. Kansas State University, 1970. (Microfiche)

27. Odell, Charles Watters. Predicting the scholastic success of college freshmen. Urbana, University of Illinois, 1927. 54 p.

28. O'Kelly, G. L., Jr. and H. T. Lester, Jr. A comparison of the college performance of students who did and those who did not study vocational agriculture in Georgia high schools in terms of grades earned during freshman year of study at Abraham Baldwin College during 1960-1961 school year. Staff Study 1963, Department of Agricultural Education, The University of Georgia. 39 p.

29. Oregon Board of Education. Occupational Cluster Guide--Agriculture. March 1970. p. 4.

30. Oregon State College Committee on Preparation of Incoming Students. A study of the scholastic success of the class of 1956. Corvallis, 1957. 123 numb. leaves.

31. Oregon System of Higher Education. Oregon State University Bulletin, Catalog Issue 1970-71. Corvallis, May 1970. 240 p.

32. Pierson, Leroy Richard. High school evaluation of student's chances for success in college. Doctoral dissertation. Corvallis, Oregon State College, 1956. 95 numb. leaves.

33. Schmidt, Richard Wallace. A comparison of high school and college grades of 131 college agricultural students. Master's thesis. Corvallis, Oregon State College, 1959. 71 numb. leaves.

34. Siegel, Sidney. Nonparametric Statistics for the Behavioral Sciences. New York, McGraw-Hill, 1956. 312 p.

35. Smith, Fay W. An analysis of the relationship of size of Arkansas high schools and the achievement of college-bound seniors. Doctoral dissertation. Fayetteville, University of Arkansas, 1961. (Dissertation Abstracts Vol. 21 pt. 6:3332-3333, 1961).

36. Stansberry, Charles Wayne. A comparative study of first year academic achievement as related to predicted achievement of freshmen enrolled in elementary education at Frostburg State College. Doctoral dissertation. Pennsylvania State University, 1965. (Dissertation Abstracts vol. 26 pt. 4:2028, 1965).

37. Stuit, Dewey. Predicting success in professional schools. American Council on Education, Committee on Student Personnel Work, 1949. 187 p.

38. Tenney, A. Webster. Agricultural Education: vocational agriculture in public schools. In: The Encyclopedia of Education Volume 1. New York, Macmillan, 1971. p. 135-136.

39. Thomas, Charles L. and Julian C. Stanley. Effectiveness of high school grades for predicting college grades of Black students: A review and discussion. Journal of Educational Research Vol. 6 No. 4:203-221. Winter 1969.

40. Tingley, Howard B. The relation between size of high school attended and scholastic success in college. Master's thesis. Corvallis, Oregon State Agricultural College, 1932. 32 numb. leaves.

41. Tom, Frederick K. T. What do studies show?--College success of former students of vocational agriculture. Agricultural Education Magazine. February 1960. pp. 172-176.

42. Worthington, Lois H. and Claude W. Grant. Factors of academic success: A multivariate analysis. Journal of Educational Research Vol. 65 No. 1:7-10. September 1971.