5. Larson, K.L., C.J. Nelson, and W.J. Russell. 1973. Use of the Weekly Bonus Problem in Audiotutorial Teaching of Introductory Plant Sciences. *J. Agron. Educ.* 2: 56-59.
6. Nelson, C.J., K.L. Larson, and S.W. Ehler. 1973. Value of an independent Research Project in an Introductory Plant Science Course. *J. Agron.* Educ. 2:50-55.
7. Smith, Ronald C., Philip C. Kozel, and J. Robert Warmbrod. 1975. Does Laboratory Reinforcement Result in Greater Learning? *NACTA J.* XIX(1): 22-23.

Academic Background And Student Performance In Beginning Crop Science

A. W. Burger and
R. D. Seif

Abstract

Colleges and universities rely on American College Test (ACT) scores and High School Percentile Rank (HSPR) in screening students for academic and scholastic successes in college work.

This study was conducted to (a) determine whether students with high ACT scores, high High School Percentile Rankings (HSPR), and high cumulative college grade point averages (CPGA's) were earning the highest crop science course grades, and (b) to find out whether there was any association between HSPR, ACT, gender, college major, and CGPA for Beginning Crop Science students.

Final course letter grades of 199 students enrolled in the introductory crop science classes during the Fall of 1981 and the Spring of 1982 were related to composite ACT scores, high school percentile rank, cumulative grade point average, college major, gender, and college class.

Seniors earn fewer A grades than other classes. Fewer males than females rank in the 90-99 high school percentile group. A higher component of enrollees with high HSPR's compared to those with low rank: (a) scored higher in the American College Test, (b) earned more "A" grades, and (c) earned high cumulative grade point averages. More enrollees with superior cumulative grade point averages (a) scored higher in ACT and (b) earned more "A" grades than those with low CGPA's. More enrollees with superior ACT scores earned "A" grades than those with low ACT scores. The student's major had no significant effect on academic performance.

The high school percentile rank, ACT score, and college cumulative grade point averages of enrollees are good predictors of scholastic success in introductory crop science student performance. The credibility and reliability of the use of ACT scores and HSPR in determining success in college introductory crop science course work are upheld and sustained.

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Introduction

Many factors and attributes affect student performance in almost any endeavor. However, do students with better academic backgrounds do better academically in a beginning crop science course? Higher achieving students were more receptive to a weekly bonus exercise in the audiotutorial teaching of introductory plant science at the University of Missouri (3). Brown et al (1) found that low achieving students have an activity delay much greater than do high achieving students, i.e., they have a lack of decisiveness of action, and perhaps an unwillingness to conform to academic requirements, routine, and regulation. Malo (4) related student background to course performance in introductory soil science. Other studies found that personal attributes and background helped determine academic performance of students (Burger and Seif (2), McKeachie (5), Schowengerdt (6), and Stevens and Herberger (7). The objectives of this study were to: (a) determine whether students with high ACT scores, high HSPR (high school percentile rank), and high CGPA's (cumulative grade point averages) were earning the highest crop science course grades and (b) find out whether there was any association between college class, gender, and college major and course achievement in the beginning crop science course at the University of Illinois.

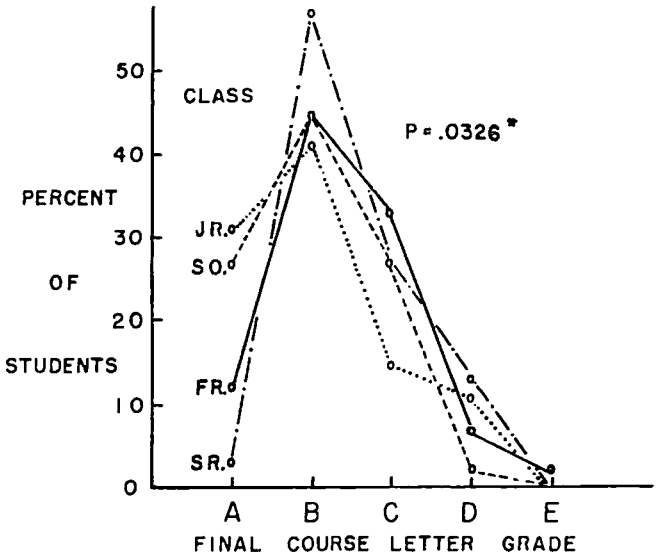
Materials and Methods

The introductory crop science course at the University of Illinois is a 4-credit hour semester course composed of three lectures and one 2-hour laboratory each week. The course is required for agronomy students and several other majors in the College of Agriculture. Although it is a course for freshmen and sophomores, a large number (over 40%) of juniors and seniors enroll each semester. The course is taught each fall and spring with an enrollment of about one hundred students per semester.

Final course letter grades (A=5; B=4; C=3; D=1 and E=0) of 199 students enrolled in the Fall and Spring semesters of 1981 and 1982 were related to composite ACT scores, high school percentile rank (HSPR), cumulative college grade point average (CGPA), college major (agronomy vs. others), gender, and college class (freshmen, sophomores, juniors, and seniors).

The ACT scores, HSPR's and CGPA's (A=5) were obtained from student records in the office of the associate dean of the College of Agriculture. The data were analyzed by Chi Square statistics computed to test the independence or association of final course letter

Figure 1. The Distribution of Introductory Crop Science Course Letter Grades Among Various College Classes, University of Illinois, 1981-1982.



grades with the various academic and other background attributes. Differences discussed are significant at either the 5% or 1% level as noted.

Results and Discussion

The distribution of introductory crop science course letter grades among various colleges is shown in Figure 1. A higher percentage of freshmen, sophomores, and juniors than seniors earn "A" grades in the introductory crop science course whereas fewer of these freshmen, sophomores and juniors tend to earn "B" and "D" grades in the course.

The high school percentile rank distribution between females and males in the introductory crop science course is shown in Figure 2. A higher percentage of females than males rank in the high school percentile range between 90 and 99; whereas, a higher percentage of males than females have high school percentile ranks from 60 to 90 and less than 50.

Figure 2. The High School Percentile Rank Distribution Between Females and Males in the Introductory Crop Science Course, University of Illinois, 1981-1982.

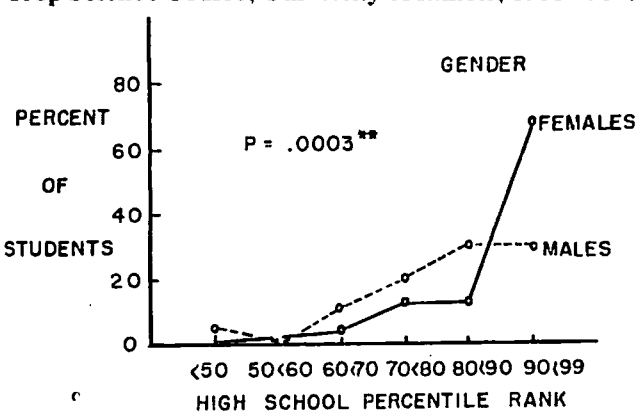
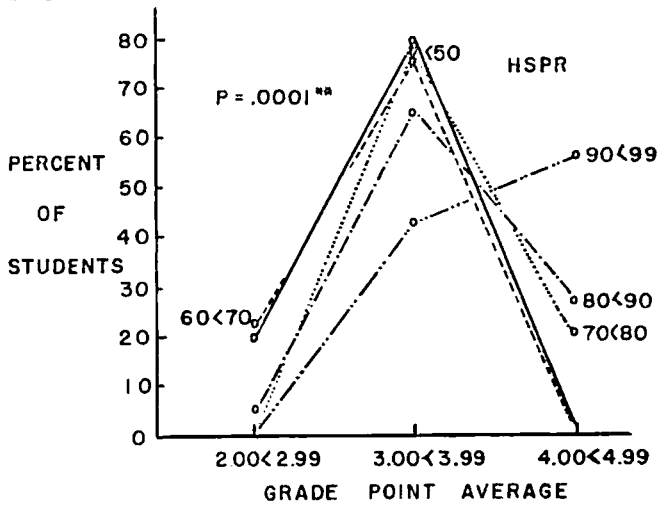
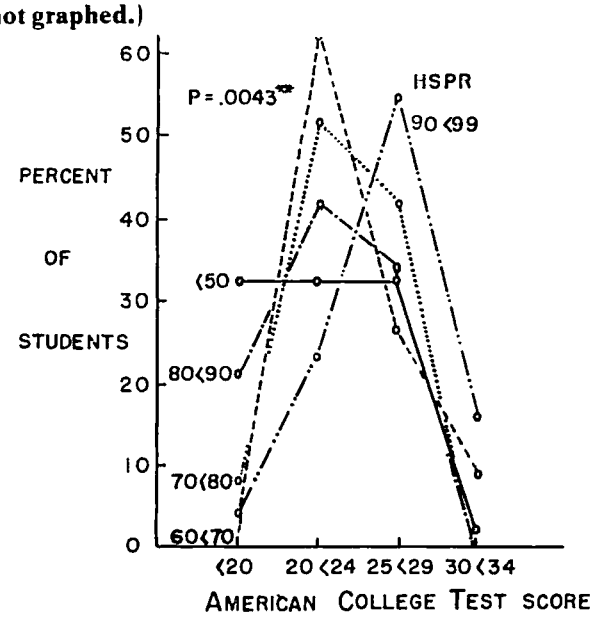


Figure 3. The High School Percentile Rank of Introductory Crop Science Students Achieving Different Cumulative College Grade Point Averages, University of Illinois, 1981-1982. (There was no student with an HSPR between 50 and 60 and thus this range is not graphed.)



The high school percentile rank of introductory crop science students achieving varying cumulative college grade point averages (CGPA) is shown in Figure 3. As should be expected, but not always verified, students with superior high school percentile ranking are earning the higher cumulative college grade point averages. A higher percentage of students with the lower HSPR (◄ 70) earn the lower CGPA's (2.00-2.99) than enrollees with the higher HSPR's (70-99); whereas, a higher percentage of enrollees with the

Figure 4. The High School Percentile Rank of Introductory Crop Science Students With Varying American College Test (ACT) Scores. (There was no student with an HSPR between 50 and 60 and thus this range is not graphed.)



higher HSPR's (70-99) earn the higher CGPA's (4.00-4.99) than those with the lower HSPR's (◄ 70).

The high school percentile rank of introductory crop science students with varying American College Test (ACT) scores is shown in Figure 4. A higher percentage of students with superior high school percentile ranking (90-99) than those with lower HSPR's (◄ 90) scored ACT scores of 25-34. A lower percentage of students with higher HSPR's (60-99) than those with HSPR's of less than 50 scored less than 20 in the ACT.

The final introductory crop science course grades of students with varying high school percentile ranking is shown in Figure 5. A higher percentage of students earned grades of "A", "B", and "C" than earned a "D" grade when comparing all students who were in the HSPR range of 90-100. Conversely, when comparing all students where high school ranking was less than 50, a higher percentage of students earned a "D" grade than those who earned grades of "A", "B", or "C".

The cumulative grade point averages of introductory crop science enrollees with varying American College Test (ACT) scores are shown in Figure 6. A higher percentage of students earning CGPA's of 4.00-4.99 than those earning CGPA's of 2.00-3.99 scored higher in the ACT score ranges between 25-34. A much lower percentage of students with the high CGPA range (4.00-4.99) than those with the lower CGPA's (2.00-3.99) are found in the ACT score ranges below 20.

The cumulative grade point averages of introductory crop science enrollees earning varying final course letter grades are shown in Figure 7. Students with high CGPA's earned the greatest number of "A" grades. A higher percentage of students with CGPA's of 4.00-4.99 than those with less than 4.00 earned "A" grades. Conversely a higher percentage of students with CGPA's of 2.00-2.99 than those with 3.00-4.99 earned grades of "D" or "E".

Figure 5. The Final Introductory Crop Science Course Grades of Students With Varying High School Percentile Ranking, University of Illinois, 1981-1982. There was only 1 "E" grade, (viz. in the 60 to 70 HSPR range).

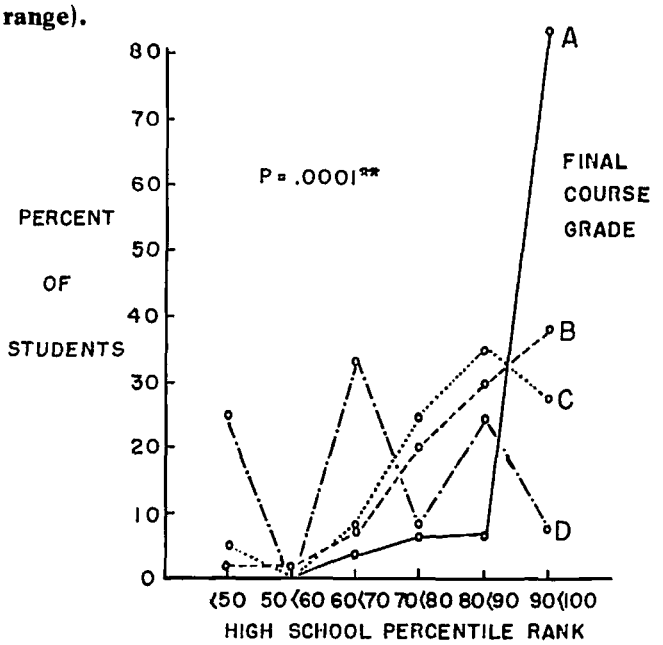
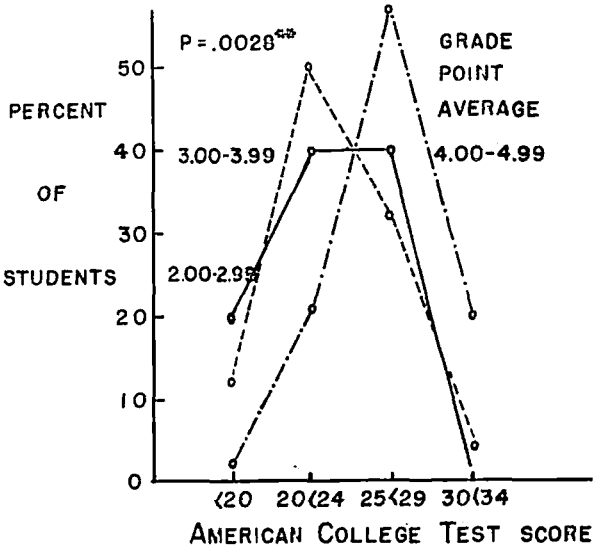


Figure 6. The Cumulative Grade Point Averages of Introductory Crop Science Enrollees With Varying American College Test (ACT) Scores, University of Illinois, 1981-1982.



The American College Test scores of introductory crop science students earning varying final course letter grades are shown in Figure 8. A higher percentage of students with ACT scores between 30 and 34 than those with less than 30 earned a grade of "A". A higher percentage of students with ACT scores of 24 or less than those with 25 or more earned grades of "C" or "D." There was only one "E" grade and it was earned by a student in the ACT score range of 25 ◄ 29.

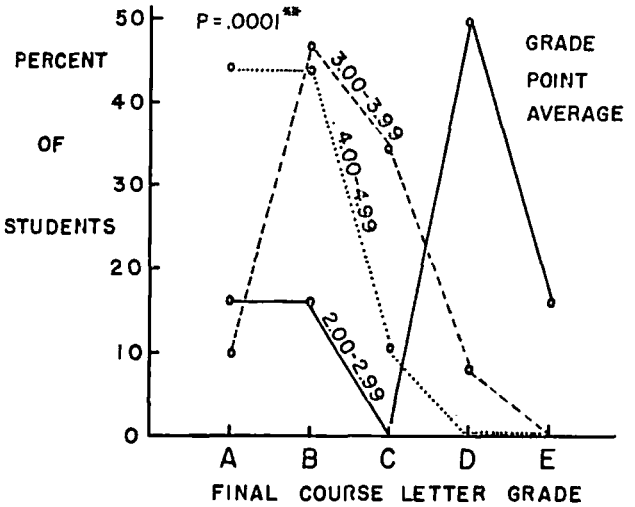
Conclusions

The result of a two semester (Fall 1981 and Spring 1982) study on the possible relationship of academic background and student performance in the introductory crop science course at the University of Illinois indicates that:

1. A higher percentage of freshmen, sophomores, and juniors, than seniors earn final course letter grades of "A".
2. A higher percentage of females than males place in the high school percentage rank (HSPR) between 90 and 99.
3. A higher percentage of enrollees with superior HSPR's (90-99);
   (a) are earning higher cumulative grade point averages (CGPA),
   (B) scored higher in the American College Test (ACT), and
   (c) are earning higher percentages of "A" grades in the introductory crop science course than that of those with lower HSPR's (less than 90).

4. A higher percentage of enrollees with superior CGPA's (4.00-4.99): (a) scored higher in the ACT, and (b) earned higher percentages of "A" grades in the introductory crop science than those with lower CGPA's (2.00-3.99).
5. A higher percentage of enrollees with superior ACT scores (30-35) are earning crop science course letter grades of "A" compared to the percentage of those with ACT scores of less than 30.
6. The major of the student had no significant effect on introductory crop science academic performance.
7. The credibility and reliance of the use of the ACT and HSPR indexes in predicting the scholastic and academic performance of introductory crop science enrollees are sustained and upheld.

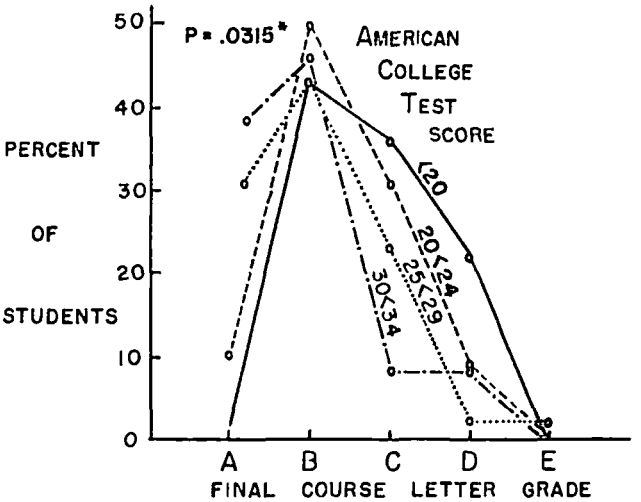
Figure 7. The Cumulative Grade Point Averages of Introductory Crop Science Enrollees Earning Varying Final Course Letter Grades in the Course, University of Illinois, 1981-1982.



Literature Cited

1. Brown, W.F., N. Abeles, and I. Iscoe. 1954. Motivational differences between high and low scholarship college students. *J. Educ. Psychol.* 45:215-233.
2. Burger, A.W. and R.D. Seif. 1975. Course performance versus backgrounds of students in beginning crop science. *J. Agron. Educ.* 4:25-28.
3. Larson, K. L., C.J. Nelson, and W. J. Russell. 1973. Use of the weekly bonus problem in audio-tutorial teaching of introductory plant sciences. *J. Agron. Educ.* 2:56-59.
4. Malo, D.D. 1977. Relationship between course performance and student background in an introductory soil science course. *J. Agron. Educ.* 6:20-25.
5. McKeachie, W. J. 1969. *Teaching Tips.* D. C. Heath and Co., Lexington, Mass.

Figure 8. The American College Test Scores of Introductory Crop Science Students Earning Varying Final Course Letter Grades in the Course, Univeristy of Illinois, 1981-1982. (There was 1 "E" grade viz. in the 25◄29 bracket.)



6. Schowengerdt, G. Carl. 1971. Predicting student academic success in college. *J.N.A.C.T.A. XV-(2):44-48.*
7. Stevens. Joe B. and T. J. Herburger. 1971. Determinants of Academic Performance: A case study. *J.N.A.C.T.A.* XIV (1):12-14.

Resources for Teaching and Learning

Wesley J.F. Grabow

Teaching/Learning Is Participation.

Teaching and learning, in my mind, have always been an integrated and joined process. You cannot separate the two actions as independent and at the same time expect them to be effective. Edgar Dale speaks of this in his discussions on communications. I would like to use some of his words and ideas and substitute teaching/learning and related terms to illustrate my premise, with the assumption that teaching/learning is also a communication process, and that teaching and learning are **participation.** A typical education model includes the teacher, the subject, and the learner. Political scientist Harold Lasswell's formula asks; "Who says what in which channel to whom with what effect?" Many models suggest that teaching/learning moves one-way, from the teacher to

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