Urban Students in Agriculture--Disadvantaged?

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Abstract

Urban and farm student performance with two learning formats was compared in crop plant and seed identification laboratories in an introductory field crop production course. Neither the laboratory format nor farm background of students greatly affected final results on identification tasks. Urban students gained significantly more than farm students from pre- to post-tests on plant identification but not seed identification.

Enrollment increases in agriculture have surpassed most previous enrollment expectations. Student enrollment increases for higher education and agriculture over a 15 year period are shown in Figure 1. This increase might have been unanticipated because of the decrease in rural population, which traditionally had accounted for the majority of agriculture students. The strong movement to leave the complex life of the city and go back to the land has resulted in agriculture courses at many colleges and universities which are composed of a majority of urban students (2, 5, 6). Urban students entering a required field crop production course at Southern Illinois University-Carbondale comprised about 10 percent of the class in 1967 but over 75 percent of the class in 1976 (2).

With an increase in agricultural enrollment expected to continue (Fig. 2), accompanied by a change in composition of agriculture classes, several educators have expressed concern about the quality of education. Because urban students lack basic terminology and farm experience, some instructors have suggested modifying curricula or instructional techniques to benefit this group. Programs instituted for students who lack farm experience include credit for farm work experience or internships (10,11,12), plant growth laboratories with "on-hands" experience (3), conversion to self-instruction modules (1,7,9), and computer-assisted instruction (PLATO) (8).

Various instructional formats have been designed to overcome the learning deficiencies of urban students. Research of educational formats reveals many successful and interesting programs, such as self-instruction, team teaching, clustering, contract grading, peer tutoring, and mastery learning. The authors concluded that self instruction with a mastery level might best fit the setting for selected laboratories of university level agriculture classes to remediate an apparent background deficiency of urban students. When mastery learning is coupled with self-instruction the intent is to capitalize on the advantages of self-instruction, such as greater educational

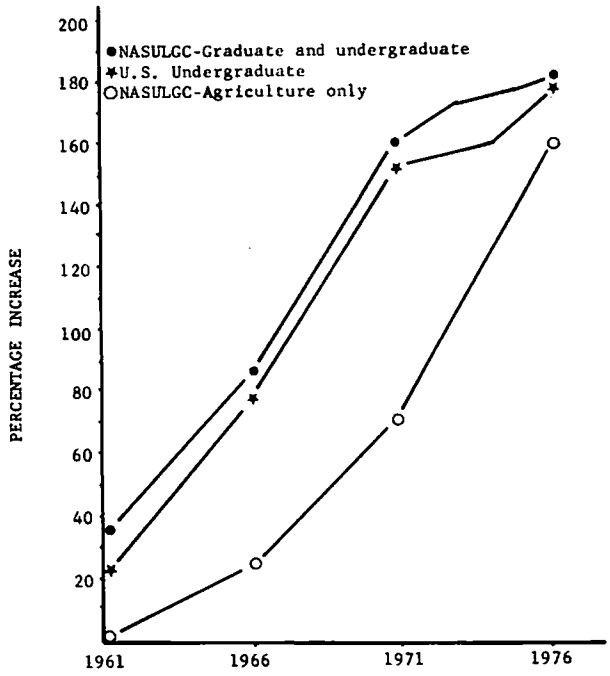

Figure 1. Percentage student enrollment increase *in higher* education and agriculture from 1961 to 1976. From Thompson, Louis M. Agricultural Enrollment in the NASULGC Member Institution. A Report to the Resident Instruction Section Division of Agriculture. November 10-11, 1975. Houston, Texas.

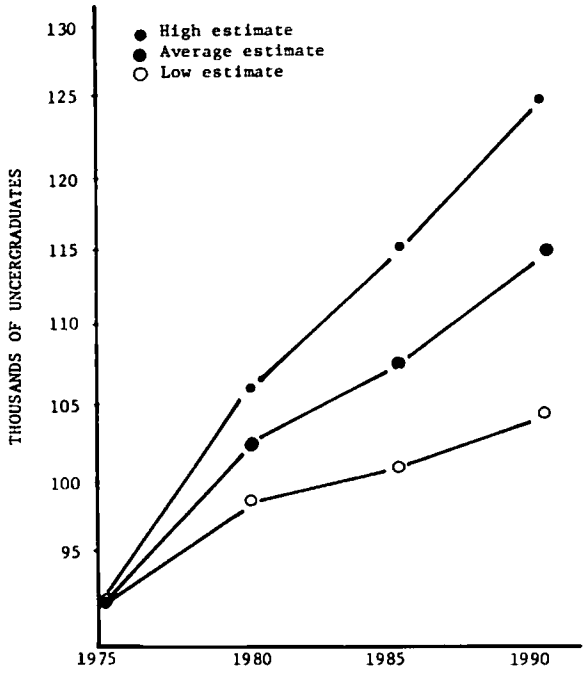

Figure 2. Metcalfe, Darrell S. 1977. Enrollment projections, undergraduate. p. 105. In Impact on Enrollments and Student Body Composition on Academic Program, Design, and Delivery. A RICOP report edited by David Armstrong, Michigan State University, East Lansing.

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freedom, and still require achievement at a specified level of performance. If mastery is not obtained initially, the student is given additional opportunities to achieve the mastery level, with no grade reduction. When mastery occurs, the teacher and student know learning objectives have been met, and as a consequence a greater student/teacher enthusiasm results (9). Apparently, a very large percentage of students have the ability to master the material (make "A" grades) under this format (4).

The objective of this study was to compare the self instruction with mastery (SIM) and self instruction without mastery (SI) formats as to urban vs. farm student comprehension of laboratory material on seeds and crop plant identification in an introductory crop production course.

Procedure

During the summer semester, 1977, 18 students in an introductory crop production course, PLSS 200, were given a general preassessment test comprised of questions from 16 topic areas discussed during the semester. In addition, a questionnaire was completed to determine student biographic and demographic data. Students were randomly divided into two groups. All laboratory material for Group I was offered on a self-instruction (SI) basis; the same self instruction material was used for Group II but students were required to reach a 90 percent mastery level (SIM) before proceeding to the next unit. At the end of the semester all students received an identical post-test and opinion questionnaire. Comparisons were made as to the relative gain from pre- to post-tests for farm and urban students within groups and the

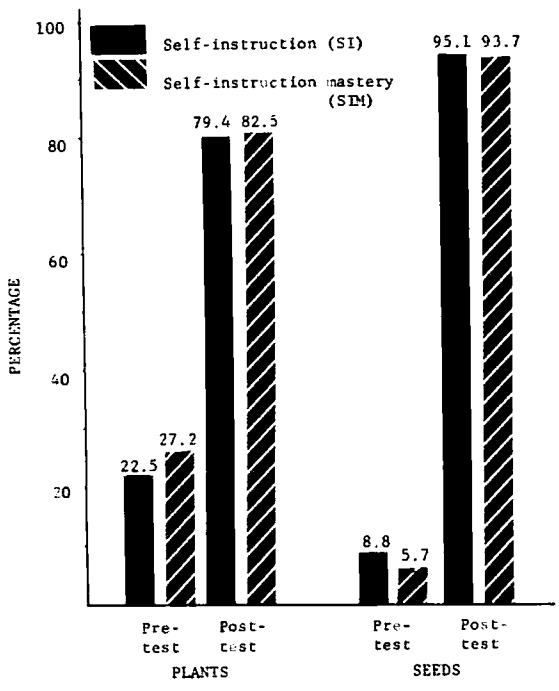

Figure 3. SI and SIM student scores of pre- and post-tests for crop plant and seed identification in Principles of Field Crop Production (PLSS 200) at Southern Illinois University during fall semester 1977.

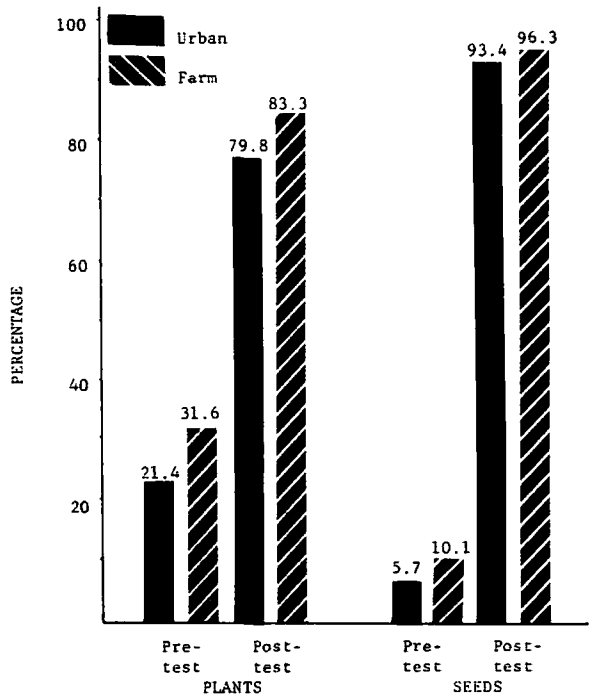

Figure 4. Urban and farm student scores of pre- and post-tests for crop plant and seed identification in Principles of Field Crop Production (PLSS 200) at Southern Illinois University at Carbondale during fall semester 1977.

gain of groups as a unit. Because of low student numbers, results were compared by descriptive statistics in an attempt to detect trends relative to further investigation.

A similar program of research was continued during the fall semester, 1977, with 109 students enrolled in four laboratory sections. Sections were randomized for treatment, and a pre-assessment test on crop plant and seed identification was given. Treatments during the fall semester for these two laboratory units were SI and SIM. Students on the SIM format were required to achieve a 90 percent score on a worksheet which accompanied the laboratory material before they could take the post-test. The average gain was computed for each group and analyzed for significance between formats and between farm and urban students within formats.

Results and Discussion

During the summer semester, 1977, nine students completed laboratory tasks with the SI format and nine students with SIM. Students with required mastery levels obtained a higher final test average on the plant and seed identification examination, 74.9 percent, than those with no required mastery levels, 57.6 percent. A comparison of student backgrounds showed the SIM students from the farm had an average of 84 percent and SI students from the farm an average of 38 percent. The non-farm students with SIM had an average score of 70 percent and with SI 60 percent.

Descriptive statistics established that students working with prescribed mastery levels performed better on identification tasks than those with no mastery levels.

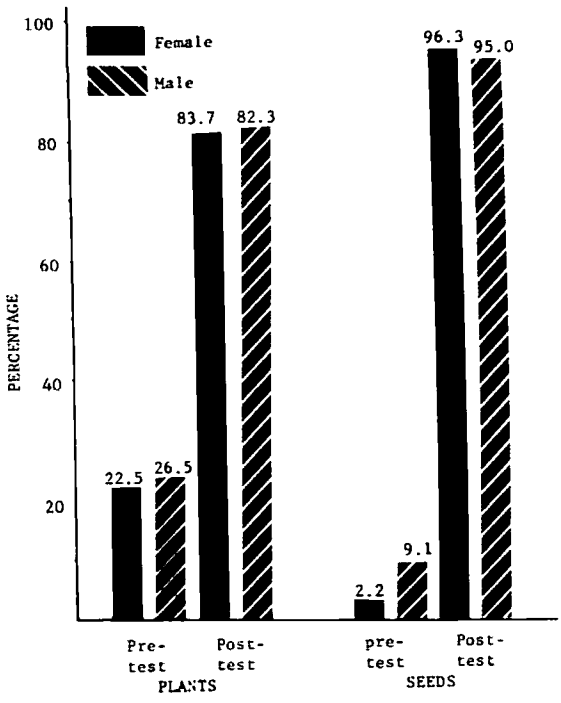

Figure 5. Female and male student scores of pre- and post-tests for crop plant and seed identification in Principles of Field Crop Production (PLSS 200) at Southern Illinois University at Carbondale during fall semester 1977.

While the small size of this class limited the conclusions which could be drawn, this apparent trend favoring the SIM format warranted further study with larger student numbers.

In the fall semester, 1977, no significant differences were obtained as a result of instructional treatments (Fig. 3). Significant differences (p=.05) were noted on the plant identification examination when comparing farm and urban students. Urban students gained significantly more from pre- to post-tests, 21.4 to 79.8 (n=66) than farm students, 31.6 to 83.3 (n=35) (Fig. 4). On the seed identification examination no significant differences were observed as to either student background or instructional treatment. The post-test scores for the two groups on seed identification included 52 perfect scores, thus giving no upper end differential. One plausible explanation of why students in the SIM format did not outperform students in SI may have been the low difficulty of identification tasks. This explanation is substantiated by the observation that 85 percent of the class achieved mastery on the first attempt. The SI students may have performed at the same level without the presumed benefit of required mastery levels.

As a matter of interest additional data including sex, farm experience, town size, major, minor, grade level, grade point average, and course requirement (elective or required) were evaluated for significance as to format and background. Of these data, differences were noted only as to sex. Although females pre-tested at a lower score than males on the crop plant examination, 22.5 (n=26) as compared to 26.5 (n=73), their overall gain (post-test of 83.7) was significantly greater than that of males (post-test of 82.3) (Fig. 5). Significantly greater gains were made by females also on the seed identification examination, where the males had pre- and post-test scores of 9.1 and 95.0 and females had 2.2 and 96.3.

Prior to this study, these researchers assumed that urban students in an introductory field crops course were greatly disadvantaged on laboratory tasks such as crop plant and seed identification. Results of this study showed generally no advantage of the SIM format over the SI format with urban or farm students. Urban students showed greater gains than farm students on crop plant identification and females (a larger percent of whom are from urban areas) showed a greater gain than males on seed and crop plant identification. Thus, under the limitations of this research (limited laboratory exercises and student numbers), results of this study do not support the view that urban students are greatly disadvantaged on such laboratory tasks as identification. The authors cannot conclude that problems do not exist for urban students in a farm-oriented curriculum, nor do these findings detract from the need for and value of farm work experience, internships, plant growth laboratories, and computer-assisted instruction. We merely suggest that instructors may be underestimating the capabilities of urban students to master material with which farm students initially may be more familiar. Instructors should continue to search for ways to improve instruction in agricultural curricula for a changing class composition.

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