References

Allison, Bruce. Microcomputers: an instructional aid. *NACTA Journal*. 27:30.

Bentley, Ernest. Computer use in the agricultural economics classroom: discussion. *American Journal of Agricultural Economics*, 64:986-987.

Brown, W.J., and J.R. Peters. Using computers to aid farm business management teaching at the University of Saskatchewan. *NACTA Journal*. 27:28.

Johnson, Steven D., Richard Carter, and W. Wade Miller. Using the microcomputer as a decision-making aid in teaching farm management: *NACTA Journal*, 28:4-6.

Litzenburg, Kerry. Computer use in the agricultural economics classroom. *American Journal of Agricultural Economics*, 64:970-977.

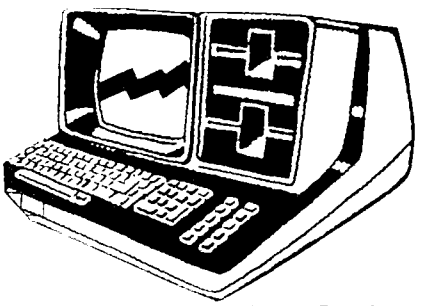
Osburn, D.D. K.C. Schneeburger, M.R. Wilsdor, and E.S. Reber. Microcomputer aided instruction. *NACTA Journal*, 25:24-25.

Stitt, T.R., James Legacy, Fred Reneau, and Richard Patterson. Microcomputers in agriculture. *NACTA Journal*, 27:39.

Waldren, Richard P. AGNET as a teaching tool. *NACTA Journal*, 27:38.

AN ASSESSMENT

Teaching Computers In Agriculture



Elaine S. Reber and Karen Kern

Introduction

Computing courses offered in Agriculture have become increasingly popular since microcomputers have the promise of becoming such a powerful force. Since the University of Missouri's College of Agriculture was one of the first institutions to offer a computing course, it seemed reasonable to assess the early results. We felt that it could result in some meaningful information for us and serve as a guide to others who are beginning to develop such a course.

Background

About four years ago, the University of Missouri's College of Agriculture Computer Committee recognized a growing need for a computing course that emphasized computer applications in the food and agricultural sciences. The administration agreed that such a course should be created and it was offered to agriculture students for the first time in Winter 1980. Both the students and teaching staff felt that the course met their main objectives but that using the University's main frame computer to run their programs was cumbersome. More important than the system's deficiencies was the realization that the computing tool of most benefit to the agriculture student was a microcomputer. As a result, the Computer committee proposed to the college administration that a room be equipped with microcomputers to serve its students, staff and faculty. The proposal was accepted and the project was jointly funded by special equipment dollars from the campus administration and the Agricultural Experiment Station.

Microcomputer Facility

The computer committee formulated the preliminary plans for equipping the facility. These included 12 stand-alone Apple II Plus microcomputers and assorted peripheral devices. In the process of preparing the equipment order, it became apparent that there were improvements in both software and hardware that should be considered. Advancements provided the opportunity to try a multi-user network where each station had full computer power, yet had the ability to share costly peripherals such as mass storage, printers, plotters and graphic displays. The Corvus Constellation Network System was chosen after seeing it in operation at Springfield High School in Springfield, Illinois. Because of the ability to share peripherals using the network concept, we were able to equip the room with 14 Apple II Plus microcomputers (instead of 12), two dot matrix printers, a plotter, two analog to digital converters (Versawriter and Apple and Graphics Tablet), two floppy disk drives, a 20 megabyte Winchester disk and a DC/Hayes micromodem. In addition, several software packages were purchased including VISICALC, FORTRAN, PASCAL, CCA (data base management system), Superwriter, etc.

Initial Course Format

In the Fall 1981 semester, the computing course was taught using the newly purchased Apple II plus microcomputers. The original objectives of the course were:

1. To gain "hands on" computing experience.
2. To learn a computer science vocabulary.
3. To gain an understanding of computers and of computing.
4. To write simple agricultural application programs in the programming language BASIC.

Eighty students enrolled in the three credit course; they were split into three sections. Each group was taught both lecture and lab in the microcomputer facility. Lecture and lab were each taught for two hours per week.

Reber and Kern are with the College of Agriculture, University of Missouri, 2-64 Agr. Bldg., Columbia, MO 65211.

Intermediate Course Format

For Winter 1982 semester, over 300 students enrolled in the course. The demand was greater than anyone had anticipated. The structure of the course needed to be changed. Lecture and labs were separated, i.e., there were four individual lectures and nine laboratories. Lecture and lab were each taught for two hours per week.

Present Course Format

Since Fall 1982, there have been approximately 260 students in the course each semester. Now, there is one large lecture class. The lecturer uses an Apple IIC microcomputer in conjunction with monitors throughout the room to show computing examples and to teach application programs. Lecture is two hours per week. The lab structure remains the same with nine laboratories having 28 students in each. Each student has an assigned two hour lab period weekly.

The objectives, the course and the facility have undergone change practically every semester. This continual change has been due to the resourcefulness of the staff associated with the course, input from students, and the dynamic microcomputing industry.

The objectives of the course have been continually reviewed. They have been broadened to include the following:

1. Familiarize the students with word processing, data base, and spreadsheet programs.
2. Introduce them to commmercially available on-line information systems.
3. Acquaint them with commercially available agricultural software.
4. Advise them of the hardware and software available so that they will be better informed consumers.

In order to support the above changes to the course the laboratory was upgraded. Twelve disk drives and software packages were purchased. Each microcomputer was connected to the hard disk system and had the facility to be a stand alone system. These changes were necessary to utilize the commercial software and, at the same time, abide by copyright laws.

The course has been restructured so that BASIC is taught for one half the semester and most of the remaining time is devoted to teaching the commercial packages:

a. Multiplan, an electronic spreadsheet
b. Personal Filing System (PFS), a data base management program
c. BANK STREET WRITER, a word processing program
d. APPLEWORKS, an integrated word processor, spreadsheet, data base system
e. SOURCE, a commercially available time share system
f. Ag disk agricultural programs

Outside speakers from local computer stores and a farm management extension specialist supplement the course material.

Methods

After teaching the course for three and one half years it seemed appropriate to survey the students for their personal views of the course as well as the effectiveness of the course in meeting its objectives.

Ten percent of all previously enrolled students were selected to be studied. Their selection was based on the following criteria:

a. They were taught the course using microcomputers (no one was sampled from first semester when we used University's main frame).
b. They had been either a junior or senior agriculture student when they took the course.
c. They had completed the course and received a grade of A, B or C.
d. They enrolled in the course during a fall or winter semester.

Furthermore, the proportion of juniors and seniors sampled was the same as the proportion of the seniors or juniors in each semester class. We also attempted to choose students from each semester with the grade distribution similar to that in the class. Choosing this group insured that the majority of the students had acquired some experience in the "real" world and that they had achieved reasonable grades. The surveys were conducted by telephone in order to acquire the data as accurately and quickly as possible.

The survey included the general background of the student, the student's personal views of the course and an assessment of the practicality of the course. The general background of the student included the name, age, occupation, degree, grade in course, and semester in which the course was taken. This part of the survey enabled us to classify the students for statistical purposes and to correlate responses to the other questions on the survey.

The second part of the survey examined the student's opinions of the course. This part was concerned with the student's feelings about the course during the time he/she took it. Part three of the survey examined how the course assisted the students in their jobs, personal businesses and in the home. This part of the survey was considered the most important since it helped determine how well the course achieved its objective of providing its students with a background in computing that will ultimately impact upon their lives.

Results

Background of Students

One hundred twenty five students were surveyed; 90 were males; the ages of the students ranged from 20 to 36. Ninety had graduated. Their degrees included 13 major fields of study offered in the College of Agriculture plus five additional dual majors. Of the graduated students, 21 percent were Agricultural

Economics majors, 18 percent were Animal Science majors. The remaining students comprised 16 other fields of study in Agriculture.

Grade Distribution

The grade distribution of the students in the sample was approximately equally distributed among A's, B's and C's. (Table I)

This distribution was representative of the grades of the past agricultural junior and senior students that have taken the course.

Occupations of Students

The students' occupations (at the time of surveying) were categorized as follows:

1. Undergraduate program
2. Graduate School or specialized education
3. Agricultural related employment
4. Computer related employment
5. Other employment
6. Unemployment

The majority of the students were in agricultural related careers. (Table II)

Thirty two percent of the students who enrolled in the course had prior knowledge of computing. Only18 percent of participating students were required by their departments to sign up for Ag 111. The remainder (82%) took the course in the absence of any such requirement. Ninety-five percent of the students indicated that they enjoyed the course. Eighty-eight percent sampled found their computing knowledge useful. Fifty-one percent utilized it during college, 34 percent used it after college and 42 percent used it on the job. Thirty-eight percent were actually using computers in their work.

Eighty-six percent felt that their interest in computing increased as a direct result of taking Ag 111. Almost 75 percent claimed that they have acquired more knowledge about computing. Since they took the course, 62 percent had taken either additional computing courses or read trade journals on the subject of computing. Thirty-eight percent of the students felt that the course inspired them to augment their knowledge in the field. Only 12 percent of the students surveyed owned computers. Of those, 17 percent used it for handling/collecting information. Another 60 percent expected to own a machine in the future.

TABLE I

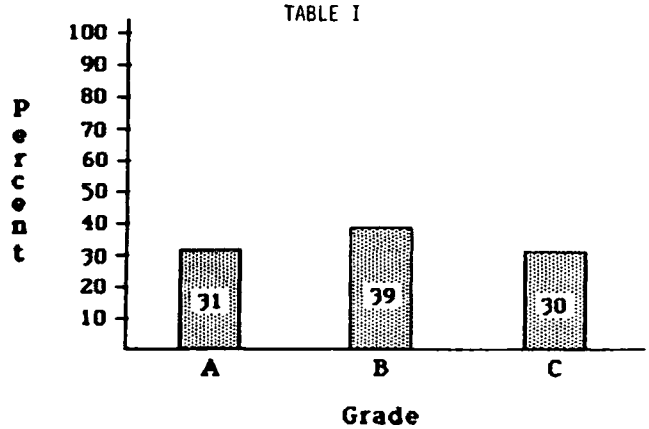
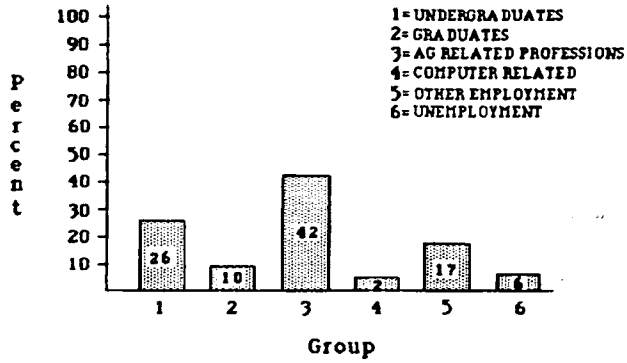


Table II



Most Useful Component of the Course

In order to identify what the students felt to be most useful in the course, the components were categorized as follows:

1. Programming
2. Lecture
3. Commercial Applications Packages
4. Special Speakers

Over half (56%) regarded programming to be the most beneficial component. One quarter considered the commercial packages most practical. Eleven percent felt that programming and applications were of equal value. The remaining eight percent offered various combinations of the above categories as their responses.

Discussion

Since most of the people who took this course had no prior knowledge of computers, many were uncertain about their expectations. Most wanted to learn more about computers to be able to program them and be able to be better users of software packages. They wanted to gain that "hands on" experience which is hard to attain any other way. Eighty six percent felt they received from the course what they expected. If the course did not live up to expectations, the use of too few packages were generally cited as the reason. These people wanted exposure to more software packages than were offered.

This course was designed to be an introductory course on microcomputers with agricultural applications for students with no knowledge of computers. The only requirement for this course was college algebra. When asked whether they felt this was a good introductory course, 95 percent replied that it was.

After studying the results of the survey, it is apparent that the course has been effective. The general feeling gained from the students is that the course is useful and beneficial to them and a positive addition to the agricultural offerings.

Suggestions for Improvement

Nevertheless, improvements were suggested by the students. They included more assigned lab time,

problems applicable to their degree programs and more commercial software. All of the suggestions were reasonable and as the course continues to change and evolve, they may be integrated into the course curriculum.

Some of the results that were predicted were not realized. We thought that more students would have graduated, be in computer related jobs, and own computers. On the other hand, since the students were exposed to word processing in the beginning of the semester, we were surprised and pleased to find that many of them used the computer to do term papers and resumes.

Bibliography

Foster, R M., University of Nebraska, C.E. Walker, University of Nebraska, "Microcomputer Instruction in Agriculture a Report of a Cooperative Approach," *NACTA Journal*, December, 1984.

Reber, E.S., "Copyright Dilemma" given at NCCI computers in Workshop, October, 1984.

Tinsley, W.A., Clemson University. "Teaching with the Microcomputer: Adoption of a New Technology," Southern Journal of Agricultural Economics, July, 1983.

Williams, W.S., Michigan University, J. Shrage, Wayne County Michigan Intermediate School District "Microcomputers and Education: An Overview of Popular Hardware and Software," *Educational Technology*, February, 1983.

CLASSROOM REPORT

Microcomputers Aid Instruction in "Livestock Management"

William C. Russell

Introduction

Over the last few years, developments in microcomputer technology and more importantly, the increased availability of agricultural software have enabled students to benefit from the speed and accuracy with which relatively low-cost modern computers can perform complicated tasks. While computers have been used in the classroom for many years (Brackelsberg, 1978), most early programs were written for large mainframe computers with the primary goal of demonstrating or applying some technique. Presently, with the advent of the microcomputer and development of agricultural software, the computer has become a tool available to anyone.

Many instructors are incorporating computers into existing courses (McGlone and Russell, 1983; Menkhaus et al., 1984) while colleges and departments are developing new courses designed solely to instruct the student in the use of computers in agriculture (Coffey et al., 1983; Foster and Walker, 1984; Menkhaus et al., 1984). The former generally parallels the introduction of the hand-held calculator into courses to speed up calculations so that more time can be spent learning pertinent material. Recently, development of innovative software has allowed the instructor to get ideas across that would be difficult or extremely time consuming without the aid of the computer.

The purpose of this paper is to discuss the development of a decision making course in Animal Science and the incorporation of microcomputers as a major instructional tool. Also considered are the rationale leading to the inception of the course, as well as the perceived benefits to the student.

Course Implementation and Structure

In 1982 a new course was developed and is now taught at the University of Wyoming titled "Livestock Management Decisions." The objectives of this course are: (1) to provide senior Animal Science students with a course that integrates the various disciplines in livestock management (Table 1) in such a way that management decisions reflect those disciplines; and (2) to incorporate computers in the class as a tool to aid in evaluating alternative decisions.

The basic content of the course is presented in Table 1. The first section is designed to evaluate each discipline in light of possible alternative decisions that may be made while stressing the interrelationships between biological and economic efficiency. This part is not intended as a review but as a thought provoking session in which students must consider alternatives. Many students who are capable of absorbing facts have difficulty in using these facts to arrive at a decision. As an example, a student may be very familiar with the characteristics of a number of breeds of cattle, however, difficulty arises when the student is required to choose breeds to go into a crossbreeding system in a specific environment. The justification for this course is based predominantly on this concept. Exit interviews with graduating seniors and discussions with recent graduates have continually identified decision making as an area not adequately covered in many curricula. Students are taught the facts and current practices but little time is spent on tying facts together to develop a logical and workable plan.

Table 1. "Livestock Management Decisions"

A.	Introduction	
	1.	Importance of management decisions in agriculture.
	2.	Application of mathematics to the biological sciences and decision making.
B.	Decisions and Alternatives	
	1.	Economics
	2.	General management
	3.	Nutrition
	4.	Genetics
	5.	Physiology
	6.	Range management
C.	Computer Applications to Decision Making	
	1.	Review of programming and computer use
	2.	Models and model building
	3.	Linear programming
	4.	Simulation
D.	Development of Management Systems Using Computer Techniques	

Russell is assistant professor of Animal Science, University of Wyoming, Laramie, Wyoming 82071.