

# A Summary Of Microcomputer Use In Agricultural Economics

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During the summer of 1986, questionnaires were sent to agricultural economics department heads in the land grant system. The questionnaire was designed to estimate the use of microcomputers in the curriculum of agricultural economics.

Of the 50 questionnaires mailed, 45 completed questionnaires were returned. The questionnaire found that 28 of the departments (approximately 62 percent) did not offer an introductory microcomputer course. Of the 28 which replied negatively, 11 required their students to take introductory microcomputer courses either in other departments in the College of Agriculture, primarily agricultural engineering, or across campus in either the Computer Science Department or the College of Business Administration.

Outlines of introductory microcomputer courses taught in the Department of Agricultural Economics were also collected. Topic outlines included the following items: 1) an introduction on the use and functions of the microcomputer, 2) an intense instruction on computer programming, primarily BASIC computer language, and 3) some discussions and use of microcomputer software packages such as spreadsheets (LOTUS, VISICALC, etc.), database management, and word processing. Because of the time constraints and the variety of subjects covered in the introductory microcomputer course, demand arose for advanced microcomputer courses which more intensely covered subjects of spreadsheets, database management, word processing, and electronic communications.

One concern expressed by instructors of introductory microcomputer courses is the propriety rights of software programs. That is, some software packages used in class, such as dBase III, LOTUS, etc. can be copied by students. In such cases, the university, and possibly the instructor, could be liable under copyright laws. As a means to protect the university and the instructor, some universities have used diskettes which have demonstrations or shorter versions of word processing, spreadsheets, and database management software. Through such demonstration software, students can learn the fundamentals and mechanics of different microcomputer software packages without the university or the instructor worrying about possible copyright infractions.

Of the 17 departments which offered an introductory microcomputer course, only four indicated that they offered advanced microcomputer courses. Interestingly, three of the 28 departments which did not offer an introductory microcomputer course offered an advanced microcomputer course. These advanced courses dealt in detail with word processing, spreadsheets, database management, and electronic commu-

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nications software. For example, at the University of Nevada-Reno, the advanced microcomputer course is taught as a five week one-hour credit block course. Each block represents a specific microcomputer software program topic such as word processing, spreadsheets, database management, or electronic communications. By registering, students can take all the course blocks or the course block, or blocks, that is of interest to them. The concept of block course offerings follows the procedure outlined by Allen, et al. (1984).

The questionnaire also asked if departments had microcomputer labs or what type of microcomputer labs were available to their students. Twenty-five departments reported having microcomputer labs. Of the twenty-five labs, seventeen microcomputer labs were used for introductory microcomputer courses, three labs were used for advanced microcomputer courses when the department did not offer an introductory microcomputer course, and five departments which have labs did not offer either an introductory or advanced microcomputer course. Further investigation found that these departments required their students to take introductory and advanced microcomputer courses in the Computer Science Department or in the College of Business Administration. These five universities also offered advanced undergraduate and graduate agricultural economics courses in which microcomputers were used to complete problem sets and homework assignments. These microcomputer labs were also available to faculty and graduate students for research work.

## Use of Microcomputers in Agricultural Economics Classes

Litzenberg (1982) notes that the major potential for using microcomputers in the classroom is the enhancement of teaching activities themselves. The major argument among agricultural economics faculty members is, "Should agricultural economists teach programming?" This argument is one of degree. Agricultural economists certainly should not be teaching the intricacies of BASIC, FORTRAN, etc. computer languages and machine language of the computer. Agricultural economists should teach enough programming to give students an understanding of how to use microcomputer software in economic analysis.

Agricultural economics departments must also consider the employment opportunities for their students. Employers want graduates with good economics training, communication skills, and knowledge of computers, specifically microcomputers, for economic and business analysis. As departments, we do not hesitate in counseling students to take additional history, political science, or communications courses. We should also be aware that employers are impressed with

students who have taken microcomputer/computer courses, especially if these courses are not only taken in the Department of Agricultural Economics, but the Computer Science Department as well. At Oklahoma State University, the Department of Agricultural Economics offers a joint undergraduate major between the Department of Agricultural Economics and the Department of Computer Science.

As expressed earlier, microcomputers have not only caused changes in agricultural economics course offerings, but they have also affected course outlines, problem sets, and homework exercises of other agricultural economics courses. The full potential of the microcomputer and microcomputer software as an instructional aid in agricultural economics is not in the introductory/advanced microcomputer courses, but in the use of microcomputers and microcomputer software in other agricultural economics courses.

An estimation of computer usage by agricultural economics classes, other than the introductory/advanced microcomputer course, was derived from a referenced study from the Northeast Computer Institute (1986). In the short time period since, microcomputers have been introduced for instructional use in agricultural economics classes and with subsequent development of microcomputer software, microcomputers have made an impact on agricultural economics instruction. Table 1 shows the use and approximate class time use of different microcomputer software by different agricultural economics classes. Most of the programs used are microcomputer software packages where students are not required to have a thorough knowledge of computer programming. However, with the aid of an introductory microcomputer course, the student can readily use these microcomputer software packages as a learning experience.

Microcomputer use is most common in farm and ranch management, agricultural finance, and production economics (Table 1). The spreadsheet programs (LOTUS, VISICALC, etc.) are used to do financial analysis such as financial ratios, depreciation schedules, etc. Large software packages similar to the Microcomputer Budget Management Simulator (McGrann, 1985) have been used to develop enterprise budgets for advanced farm and ranch management courses. In the fall 1983 semester, many land grant universities received a grant from the Harris Corporation to purchase AgDisk microcomputer software. AgDisk is the Trademark for the various agricultural microcomputer software packages offered by the Harris Technical Systems Corporation. This software could be used in farm and ranch management, agricultural finance, and agricultural marketing courses. The Cash Flow and Records Program was used by advanced farm and ranch management and agricultural finance courses. The Cash Flow and Records Program required farm financial records as input and produced cash flow projections for homework assignments. Also, by making changes in the data input, students could see how cash flow projections changed if certain parameters were changed, such as payment terms for accounts receivable or payable. This procedure gives the student the ability to use different farm financial and marketing decisions and to see how these decisions affect projected cash flow.

Farm simulators were used by many advanced farm and ranch management classes. Farm simulators have long been used with mainframe computers, however, computer costs and machine availability has limited its use in instruction. The disadvantages of mainframe computers are reduced with microcomputer farm level simulators. Students with introductory microcomputer knowledge can use the farm simulator to do business games. Through the farm simulator, students can realize the consequences of their farm level production, financial and marketing decisions on the financial viability of the farm. Students can also learn the principles of risk management and how risk can be incorporated in whole-farm or ranch planning.

Operations research and econometrics classes use many different microcomputer software packages (Table 1). With the microcomputer, more undergraduates are able to run regression models to derive production functions and linear programming models to find optimal farm production plans. The use of these programs at the undergraduate level may bring about demands for more undergraduate operations research and econometrics courses.

These operations research and econometrics packages are also used in graduate classes. This lowers instructional costs compared to similar exercises run on the mainframe computer. Because of the emphasis on compatibility for microcomputers, especially IBM compatible, software has been developed which can run on a number of machines. Students, especially graduate students, have the opportunity to learn a number of operations research and econometrics packages. This is advantageous because students often move to universities, businesses, or government jobs which have mainframe computers different from those at their university. If this occurs, the student may not be familiar with the available operations research and/or econometrics software. This can

**Table 1. Agricultural Economics Courses which Use Microcomputers, Types of Software Used, and Range of Class Time of Microcomputer Use.**

Courses	Microcomputer Software Used	Range of Class Time Use
Agricultural Marketing and Prices	SAS, MPS-PC, LOTUS RATS, Market Charts	5% - 30%
Farm and Ranch Management, Finance, and Production	LOTUS, SuperCalc, MPS-PC, TSP, SAS, Budget Generator Cash Flow and Records Program, Farm Simulator	10% - 70%
Agribusiness	LOTUS, Financial Analysis Program, Purdue Agribusiness Simulator	10% - 33%
Econometrics and Operations Research	SAS, SHAZAM, TSP, MPS-PC, LINDO	10% - 20%
Community Development and Resource Economics	LOTUS	10%

Spreadsheet microcomputer programs are LOTUS and SuperCalc. Statistical microcomputer packages are SAS, RATS, TSP, and SHAZAM. Linear programming microcomputer programs are MPS-PC and LINDO. The other microcomputer programs are simulation, marketing, and accounting programs offered by Harris Technical Systems, Purdue University, and Texas A&M university.

