

AN EVALUATION OF ON-FARM MICROCOMPUTER USE

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Many American farm families recognize that the microcomputer represents a technology that will affect their lives significantly. Dobbins and Suter (1981) noted that the impact of the microcomputer on farming may equal that of the farm tractor in the 1930s. Microcomputer usage and computer services will provide new challenges and opportunities for farm operators for many years to come.

The breakthrough of the 1980s in agriculture will most likely occur in the method and efficiency by which computers can aid in making management decisions (Hinman and Willett, 1981). The microcomputer as a tool gives farm operators the ability to analyze a large amount of information needed for effective decision-making. However, the conclusions drawn from the microcomputer data are only as good as the records kept.

Farm operators are realizing that microcomputers may be a profitable investment and can become an even better investment in the future (Hinman and Willett, 1981). It was the development of the microcomputer in the mid 1970s, along with computerized services offered to farm operators, that created significant computer applications in agriculture.

However, there are some problems to overcome if microcomputers are to be used effectively in the farm business. The computer presents a scare factor that users must overcome (Eighmy and Fuller, 1980). The farm micro-computer user must be willing to invest the time required to learn how to run the system. The farm operator must be willing to keep accurate records. In addition, the microcomputer must be thought of as a cost-effective management tool.

Nieuwsama (1984) found in a study of county Extension agents that the more encouragement received by the computer user, the more the individual used the computer. She also found that a major disadvantage of using a computer was the time it took to run and use the computer programs.

Purpose and Objectives

The primary purpose of this study was to determine the extent to which farm operators were using microcomputers. Additionally it was thought that perceptions held by farm operators regarding the use of microcomputers was important in planning educational programs.

Specific objectives of the study were:

1. To describe the microcomputer user and extent of microcomputer use at the farm level in Tama County, Iowa.
2. To identify the farm operator's educational background and sources of microcomputer training.
3. To identify support services and need for educational programs in using a microcomputer on the farm.
4. To identify perceptions held by farmers in Tama County, Iowa, regarding the use of microcomputers.

Methods and Procedures

The population consisted of all farm operators in Tama County, Iowa, who owned a microcomputer at the time of the study and produced at least \$5,000 in gross agricultural receipts from their farming enterprises. A potential respondent included any *person* who was part of the farm business and operated the microcomputer for the benefit of the farming operation. An effort was made to identify all those farm operators in Tama County who owned a microcomputer at the time of the study. Operators who farmed land in Tama County but lived in bordering counties were also considered as part of the population. A list of microcomputer users was compiled from current extension education programs, vocational agriculture adult farmer classes, and community college programs in Tama County. Microcomputer dealers, computer clubs, and key farm operators were

also contacted to update the list of probable microcomputer users. All lists were cross-referenced to avoid duplication of participants. The resulting list represented those farm operators who had shown interest in using a microcomputer for application to the farm business. The list included a total of 164 farm operators in Tama County, Iowa.

Participants in this study were asked to complete a questionnaire developed by the researcher. The questionnaire consisted of four major sections: (a) attitudes and perceptions regarding the use of the microcomputer, (b) descriptive information regarding computer usage e.g., hardware and software, hours of use, (c) farm operation and descriptive data, and, (d) biographical data on the farm operator. In developing the questionnaire, the teacher used instruments from other studies to form the questions (Erickson, 1982; Scherer, 1983; Snyder, 1984). Other items were added to complete the 64 item questionnaire. The instrument was reviewed for content validity by faculty of the Iowa State University Department of Agricultural Education, and the Iowa Extension Education Microcomputer Specialist. The instrument was field-tested for question consistency, ease of reading, and completion time. The panel of field testers consisted of farm operators in an adjoining county who were not included in the study. The panel was asked to evaluate and identify potential problems and to suggest minor changes.

Data were analyzed using means, standard deviations, frequencies, and percentages.

Findings

Data were collected from 96 of the 164 (59% response rate) on-farm microcomputer users in Tama County, Iowa. Follow-up procedures with a 10% sample of the non-respondents indicated no significant differences between respondents and non-respondents regarding the scaled portions of the questionnaire. Of the respondents, 66 percent (63) of the farm operators owned and were using microcomputers in their farming operations. Eighteen percent (17) of the farm operators did not own a microcomputer, but did have a high degree of interest and were considering purchasing a microcomputer. Twelve percent (12) of the operators decided not to fill out the questionnaire completely, but they did provide useful written comments. Two farm operators (2%) had given away or sold their computers, and two farm operators (2%) were no longer engaged in farming.

Description of Farm Operators: Two-thirds of the farm operators who owned a microcomputer also owned livestock. Over 95% of those who owned livestock raised swine. The average number of head raised by those producing swine was over 900 per year. The next major livestock enterprise was cattle, with 24 operators averaging over 100 head per par.

The typical farm on which a microcomputer was used in Tama County was over twice as large as the state average size of 303 acres, according to data reported in 1986 by the Iowa Crop and Livestock Reporting Service. As expected, almost all operators produced both corn and soybeans with the average farm size of 634 acres per farm. The average size of all farms in Tama County was 304 acres (Iowa Agricultural Statistics, 1986).

The average age of the respondents was 38.5 years with over 60 percent being 39 years of age or younger. Over 80% of the respondents had some postsecondary education with 30% of the respondents having a BS or BA degree or above. Seventy percent of the farm operators who were the primary operator of the farm microcomputers were males. The gross farm income was \$100,000 or more for 74% of the operators. Only 5% of the respondents had owned their computer more than four years.

Almost one-third of the respondents used their computer five hours a week or less. Only one-third of the respondents indicated that their use was more than five hours per week. The primary reason for purchasing a microcomputer was for farm record keeping and financial management. This finding is consistent with the finding that almost three-fourths of the respondents used the microcomputer for farm business purposes 50% of the time or more.

Fifty-three percent of the respondents were using an Apple computer and 26% an IBM computer. The remaining respondents used Radio Shack, Digital, and Commodore brands of computers. Eighty-four percent owned a printer, while 175 percent owned a modem. The five most popular software programs being used were spreadsheets, farm accounting, word processing, farm records, and crop budgets.

These respondents were almost all self-taught or learned by using the services of an area community college. Almost one-half of the respondents had received two hours or less of formal microcomputer training.

Support Services and Need for Education: When respondents were asked what tasks they were using the computer to **perform, the top four were** farm accounting, farm cash flow, calculating returns per livestock enterprise, and calculating crop production costs. When asked to identify where they would take data generated by the microcomputer for assistance in analyzing them, the respondents indicated Extension agents, bank lending officers, friends, and certified public accountants.

When asked to select the educational programs they would like to attend to gain more knowledge about using the microcomputer in their operation, the respondents identified cash flow and budget analysis for enterprises, farm accounting, and on-line data services as the top choices.

Perceptions of Microcomputer Users: The perception scale ranged from one to five (5 = strongly agree, 1 = strongly disagree). For the purpose of this study, ratings of 3.75 and above, and 2.75 and below, were arbitrarily selected to be significant enough to merit attention. These values were determined before the data were compiled and analyzed. These responses are presented in Tables 1 and 2

Table 1
The Highest Mean Ratings (> 3.75) and Standard Deviations Regarding Use as Perceived by Farm Microcomputer users in Tama County, Iowa.

| Item | Mean | SD |
|---|------|------|
| It is a useful tool on the farm | 4.57 | 0.64 |
| It is one more management tool | 4.56 | 0.74 |
| Helped <i>me</i> make decisions | 4.52 | 0.68 |
| Arranged my information correctly | 4.44 | 0.78 |
| Stored my information correctly | 4.41 | 0.78 |
| The longer used, the more uses found | 4.33 | 0.83 |
| The number of farmers using will continue to increase | 4.32 | 0.74 |
| Helped me become more organized | 4.31 | 0.83 |
| Valuable as a management tool | 4.25 | 0.89 |
| Use time is more productive the more used | 4.25 | 0.81 |
| Helpful for calculating enterprise costs and returns | 4.23 | 0.95 |
| Record quality has improved since using microcomputer | 4.18 | 0.98 |
| Lending officer encourages me to keep records | 4.12 | 1.14 |
| Helpful in doing farm accounting | 4.10 | 1.08 |
| Is used in my operation quite often | 3.98 | 0.99 |
| Helped me save money last year | 3.82 | 1.07 |

Table 2
The Lowest Mean Ratings (< 2.75) and Standard Deviations Regarding Microcomputer Use as Perceived by Farm Users in Tama County, Iowa.

| Item | Mean | SD |
|---|------|------|
| Analyzing, buying, and selling breeding stock | 2.74 | 1.16 |
| Could do without my computer | 2.69 | 1.10 |
| Present use same as anticipated at purchase | 2.56 | 1.19 |
| Am using the computer to maximum potential | 1.93 | 1.01 |
| Mostly a piece of recreational equipment | 1.87 | 0.96 |
| The computer is a passing fad | 1.42 | 0.88 |

One area that did not fit the pattern of previous data is the disagreement with the statement that the present use was the same as anticipated when the microcomputer was purchased. Previous data presented would suggest that the use of the microcomputer is much the same as the mason given for purchasing it: To use it for farm accounting and management. The use question may have been interpreted as number of hours of usage or as the respondents perceived that the farm management functions would require less or more time than was actually required.

Conclusions and Recommendations

The respondents generally agreed that the microcomputer is a valuable management tool. On-farm microcomputer users feel that they are not using their microcomputer to its maximum potential. There is a need for agriculturally-oriented microcomputer educational courses.

The primary reason farm operators purchased a microcomputer was to improve their financial analysis and record keeping ability. When seeking assistance with their microcomputer data, farm operators are most likely to seek-out their Extension agent or bank lending officer.

The respondents in this study indicated that use and ownership of microcomputers will increase. Tama County is a large county with a wide cross section of traditional agricultural enterprises. The county is typical of Central Iowa counties in that the major enterprises include corn, soybeans, hogs and cattle. However, Tama County farmers may be unique in their attitudes toward the adoption of technology and education. Caution should be exercised in drawing implications to other areas of the Midwest.

Regular agriculturally-oriented microcomputer classes should be offered in Tama County or should be easily accessible to Tama County farmers. These classes should work with specific software programs and be targeted for different levels of experience and knowledge.

Farm financial management instruction directed at farm operators should contain a microcomputer records component.

Educational, financial, and service institutions in Tama County should cooperate to provide support for those farm operators who are attempting to upgrade their record keeping systems and adopt microcomputer technology.

Monitoring of the on-farm microcomputer population in Tama County should continue so those providing programming will better understand the needs of the potential audience.

Implications

As with any new technology, a number of challenges need to be addressed as the microcomputer is utilized at the farm level. These challenges focus attention not only on the needs for appropriate computer hardware and software, but also on appropriate educational programming, delivery systems, and evaluation activities.

If educators are to provide timely programs that help operators make the best use of new technology, they must understand the needs of the potential audience. The information from this study will facilitate development of better educational programs that will more closely match the needs of those farm operators who are striving to use microcomputer technology in their farming operations. The finding of this study have implications for improving farm management during a period of great change in agriculture.

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