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Attitudes of Iowa Cooperative Extension Service personnel toward microcomputer technology

by

Jimmy G. Richardson

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INTRODUCTION

Even though only a few years old, the computer seems destined to have a greater impact on human lives than any other technological development in recent history. As Shane (1981) stated, "Our task is coping with and using constructively the new social environment that is emerging as computers approach an era of virtually exponential growth" (p. 303). Education and educational agencies are faced with the challenge of helping people understand and make the best use of computer technology.

The impact of computers can be felt in most areas of everyday life.

> ... computers have assumed a pervasive role in everyday life in such important functions as communications, transportation, education, government, consumerism, entertainment, and employment. In addition to its direct impact on these lifelong functions the computer has, itself, increased the importance of computing as a major human function (Eiselle, 1980, p. 84).

To better understand and more effectively utilize the computer, it is important that people become computer literate. Winkle and Mathews (1981) emphasize that computer literacy -- defined as whatever a person needs to know about and be able to do with computers in order to function competently in our society -- is fast becoming a basic survival skill.

A computer is an electronic machine that can accept information, process that information by carrying out mathematical operations at high rates of speed, and process a result (Horn and Poirot, 1981).

The first electronic computer was completed in 1946. It contained 19,000 vacuum tubes, could do 300 multiplications per second, drew 130,000 watts of electricity, and was tremendously large and expensive. Its name was ENIAC (Sanders, 1974).

Since ENIAC, computers have undergone several transformations in physical size, cost, speed, and memory capacity. Computers today are classified as microcomputers, minicomputers, or mainframe computers. The microcomputer is the smallest of the three.

Microcomputers, also referred to as personal computers, can basically do the same work as their larger counterparts but in smaller pieces and at a slower rate. It is designed for single users (Horn and Poirot, 1981). The computers used by the Iowa Cooperative Extension Service at the present time are microcomputers.

One of the aims of education is to improve the learning process (Long, 1981). In trying to fulfill this aim, educators have an obligation to experiment with new technologies that are available. Certainly the use of microcomputers is an area of unrealized opportunity.

One educational system charged with the responsibility of increasing educational emphasis in the area of microcomputer technology is the Cooperative Extension Service. A recently published report, Extension in the '80s (1983) strongly suggests that the "... acceleration of the development and capacity to utilize computer technology in communication and dissemination of information as well as the capacity to serve the needs of farm operators for software programs and data bases..." is vital (p. 9). Extension's aim is to help people identify and solve

problems and this goal can be enhanced through the use of new technology such as microcomputers. But to train others to become competent in using and working with microcomputers, Extension educators themselves must become microcomputer knowledgeable.

The Cooperative Extension Service in Iowa has taken steps toward becoming involved in microcomputer technology. In 1981, Iowa Extension purchased 25 Apple III microcomputers, placed one in each of 12 area offices, and the remaining 13 in various departments on the Iowa State campus (Kruse, 1983). To date, 61 county offices have purchased microcomputers. Most of these have software packages to accommodate word processing, mail list management, business graphics, electronic spreadsheet, and data base management. Thirty-seven microcomputers are now located in subject matter locations on campus (Crom, 1983).

Several steps have already been taken by the Iowa Extension to help prepare personnel to more effectively utilize the microcomputer. A microcomputer inservice training was planned and implemented in late 1982 and early 1983. Approximately 350 field staff and 215 campus staff participated in one or more levels of the training. Most of the training focused on using the microcomputer as an educational tool. Two hundred forty staff members also worked on developing awareness and skills related to office management functions (Crom, 1983).

Even though much research on planning and utilization has gone into the purchase of microcomputer hardware and software for Iowa Extension's use and into the training of personnel in the use of microcomputers, several questions remain to be answered. If Extension

personnel are to effectively educate clientele, what are the skills needed and knowledge necessary for providing this education? What delivery systems, methods, and techniques are necessary and most effective? How do Extension personnel feel about the need to become computer literate? How literate are Extension personnel already? What level of competence do incoming Extension personnel possess?

Statement of the Problem

The primary purpose of this study (sponsored by Iowa Agricultural and Home Economics Experiment Station Project 2617) was to ascertain the attitudes of the Iowa Cooperative Extension Service personnel toward the use of microcomputers in Extension. The secondary purpose was to determine the training needs of Extension personnel in microcomputer technology.

Objectives

The specific objectives were:

1. To determine selected characteristics and computer experiences and training of Extension personnel.
2. To determine the attitudes of Extension personnel toward the use of microcomputers in their work.
3. To determine current educational and management use of microcomputers by Extension personnel.
4. To determine future training needs of Extension personnel in microcomputer technology.

Significance of the Problem

Microcomputer technology is a new and phenomenally fast-growing innovation in education. Microcomputers were not even commercially

feasible until 1975, yet in 1981, more than 3 million were sold in the United States, with sales in the billions projected for 1985 (Shane, 1981). Such an influx raises questions about acceptance of this innovation by education personnel. Introduction of computer technology into an organization without recognizing the shock effect of change can have a serious impact on the functioning of the organization and can minimize potential organizational benefits of the innovation (Eisen, 1981). Keen and Discaart state, "... resistance from personnel can be a serious detriment to the computerization of any business" (1982, p. 42).

Personnel resistance can be expressed in many different forms. Those mentioned by Sanders (1974) include: (1) withholding information; (2) providing inaccurate information; (3) distrusting computer output; and (4) showing lowered morale. Other reactions include personal hostility (Keen and Discaart, 1982) and fear (Abshire, 1982).

Extension administrators are aware that effective utilization of computer technology can only be realized when the computer is accepted and mastered by personnel at all levels and utilized on a daily basis in program planning and implementation, data storage and analysis, word processing, and other office management functions. In an effort to encourage personnel to accept and utilize microcomputers to a greater extent than in the past, it is imperative that efforts be made to assess current attitudes, skill level, and utilization needs of Extension staff at all levels. Such knowledge is necessary to determine: (1) future inservice training needs; (2) more effective educational techniques; (3) budget requirements (for training,

acquiring hardware, developing software); and (4) preservice training opportunities of incoming personnel.

Hypotheses

1. There are no significant differences in the attitudes of Extension personnel toward the use of microcomputers in Extension work when grouped according to:
   a. program areas of responsibility
   b. level of assignment (county or area)
   c. selected demographic variables.
2. There are no significant differences in the perceived training needs of Extension personnel in computer technology when grouped according to:
   a. program areas of responsibility
   b. level of assignment (county or area)
   c. selected demographic variables.

Operational Definitions

Many of the terms used in this study are unique to the Iowa Cooperative Extension Service. The following definitions are offered in an effort to clarify these terms and add precision to the description and discussion of the study:

ICES - Iowa Cooperative Extension Service. A publicly supported, informal, out-of-school educational organization of the United States Department of Agriculture and the land grant university systems. Primary program areas are agriculture, home economics, 4-H and youth, and community resource development.

Extension Agriculturist - A professional ICES worker responsible for the agriculture program in one county. In most instances, the Extension Agriculturist is also the County Extension Director (CED), who is the administrative leader of the county Extension program. However, there are cases where the CED is the Home Economist and may, in the near future, be the 4-H and Youth Leader. The title of Extension Agriculturist does not necessarily imply the title of CED.

Extension Home Economist - A professional ICES worker responsible for the home economics program in one or two counties.

Extension 4-H Youth Leader - A professional ICES worker responsible for the 4-H and Youth program in one, two, or more counties.

Area Specialist - A professional ICES worker with a program area of specialization serving one of the twelve 7-to-11-county administrative areas. For purposes of this study, those professional area personnel with administrative responsibilities are designated as area specialists.

REVIEW OF LITERATURE AND RESEARCH

Introduction

The purpose of this chapter was to present a review of applicable literature and research in the computer technology area. A general overview is first presented dealing with computers and their role in an information society. Areas examined included acceptance of computer technology, barriers to acceptance, overcoming barriers, and computer technology in Iowa.

Research relating to computer-technology and Cooperative Extension work was then reviewed. Studies conducted in Iowa and other states were examined and, when appropriate, used to help develop a rationale for this research.

Review of Literature

Computing plays a crucial role in everyday life and in the technological future of this nation. The ability to use computers is now considered as basic and necessary to a person's formal education as reading, writing, and arithmetic. As jobs become increasingly oriented toward the use of information, society demands and rewards individuals who know how to use information systems. Yet, despite computing's critical importance today, the overwhelming majority of this country's general public is woefully ill-prepared to live and work in the "Age of Information," as some have called it (Luehrmann, 1983).

The Federal Cooperative Extension Service is one of the largest publicly supported informal adult education organizations ever created

(Sanders, 1966). Extension's mission involves diffusion of knowledge, primarily in the areas of agriculture, home economics, youth development, and community and rural development. To remain competitive in the educational field, Extension personnel must become proficient in computer technology.

The literature abounds with indications that the future will involve increased use of microcomputers to meet agricultural, homemaking, and general family needs. Lambrecht and McClelland (1982) state that homemaking and consumer professionals need to become skillful in using microcomputers in teaching and program management, updating the content taught in consumer and homemaking programs, and assisting families who wish to have access to computers. Uthe (1982) points out that home economics programs must prepare homemakers for the electronic world in areas such as shopping, home management, cooking and nutritional analysis, and personal finances. Evidence of the concern of home economics educators is found in the development of the National Consortium for Computer-Based Education in Home Economics organized in 1978 (Bouyer, 1982).

Agriculture will also feel the impact of computerization. Lanpher (1980) stated:

> I feel it is the responsibility and an opportunity for the Cooperative Extension Service and for Agricultural Research to be working to bring about effective and feasible use of computer-type technology into agricultural decision-making ... work in this area is fully in line with Extension's mission... (p. 43).

During the decade of the 1970s, managing a farm or ranch became considerably more complex. Sometimes this complexity resulted from a

decision to expand the farm operation, particularly when planning to use debt capital. Other events occurring off the farm or ranch have also contributed more than their share to the manager's problems. Some of the major shocks to agriculture were highly variable weather conditions, political decisions to expand agricultural trade followed by partial embargoes, and economy-wide inflationary pressures leading to unprecedented costs for borrowed funds. Such factors emphasize that potential gains or losses from individual decisions are now more substantial than ever, which means that farmers and ranchers must have more correct information than ever when making decisions (Sonka, 1983). The computer is a tool capable of supplying that information.

Several information networks are already in existence in the agricultural area, such as ANSER (Agricultural Network Serving Extension and Research) (Moore, Davis, and Debertin, 1980), Purdue's FACTS (Fast Agricultural Community Terminal System) (Wott, Santin, and Bernstein, 1981), Nebraska's AgNet (AgNet User's Manual, 1983), NCCI (North Central Computer Institute) (Schmidt, 1981), and Iowa State University's AIDS (Agricultural Infodata Service) and IPM (Integrated Pest Management) (AIDS, ca. 1982) networks. With these and scores of other microcomputer programs and applications in agriculture, Extension needs field staff trained in the essentials of microcomputer operation to address the subject-matter problem-solving approaches traditionally provided to Extension clientele (Nelson, 1980).

Acceptance of Computer Technology

Even though a vast amount of literature indicates that the future will involve increased use of computer technology, the path may not always be easy. Employee motivation towards accepting and using the computer can be a real problem. People work and learn in different ways and at different rates, so the introduction of computer technology into any organization must be handled carefully (Emmett, 1983).

Emmett identified several strategies for motivating employees to accept computer technology. The strategies are based upon an identification of who will be using the computer, how it will be used, and what jobs must be accomplished. The strategies included:

1. Giving training and education to personnel who need familiarity with computers. Identify the kind that will be the least threatening (tutorial, outside seminars, self-study, etc.).
2. Involving management and other personnel in the training choice and process.
3. Giving innovators the opportunity to take the computer home.
4. Understanding and planning for the learning time involved in both using the computer (gaining knowledge and facility) and for getting regular jobs done.
5. Being extra patient with older employees who may fear the computer or not be interested in it.
6. Distinguishing between using the computer as a "motivator" and a "satisfier." Watch out for computers as "expensive pieces of electronics candy."

Barriers to acceptance

Even though strategies can be identified for motivating employees to use computers, many will still be reluctant to accept the new technology. Lidtke (1981), in a paper presented at the National Conference on Technology and Education in Washington, D.C., identified several reasons why educators are reluctant to accept new technologies. They include:

1. Little concrete evidence of the effectiveness of computers.
2. Educator resistance to change.
3. Lack of training in the use of the computer.
4. Lack of adequate hardware and software.
5. The need to change teaching style to use the new technology.
6. The fact that extra time and preparation are required to use the new technologies.

Overcoming barriers

Lidtke also made several suggestions for overcoming the reluctance to accept innovations. She suggested providing a specialist to consult with Extension personnel on computer sessions, and rewarding those who are innovative in adapting computer technology to their instructional programs (Lidtke, 1981).

The agricultural sector of our society has been relatively quick to adopt productive technologies. This tendency to accept and utilize change has contributed to the efficiency of United States agriculture and its ability to compete aggressively in export markets. Rural sociologists have extensively evaluated the adoption process of farm

technologies. Their research can help us understand what factors affect the rate at which technologies are adopted and the potential for the adoption of farm computers (Sonka, 1983).

According to Rogers (1971), there are five attributes of any innovation which affect the rate at which that innovation is adopted. The attributes identified are relative advantage, compatibility, complexity, trialability, and observability. Sonka (1983) discussed each in relation to acceptance of computer technology.

Relative advantage relates to the extent to which we perceive that a computer would have an advantage over the present system of acquiring information. Relative advantage is easily understandable in economic terms -- a more profitable innovation is more likely to be adopted than a less profitable one. Farm computers, though, do not directly generate profit by increasing output. The computer can improve the management information system, but it is difficult to estimate a precise rate of return associated with the adoption of a farm computer.

The relative advantage of the computer is largely dependent upon our present information system, which can vary from farm to farm. Therefore, the relative advantage of the computer will differ from farm to farm. Since we are in the middle of a business management revolution in agriculture, however, the relative advantage of the farm computer should be increasing. Farmers will require greater amounts of information and the services of more sophisticated information systems. The real advantage, therefore, of the farm computer should increase over time.

Compatibility relates to whether a particular innovation is consistent with the present values and beliefs of the individuals considering that innovation. One important type of compatibility is the compatibility of computers with the farm information system. More importantly, however, is the degree to which farmers search out and accept new tools. Modern farmers have a history of aggressively pursuing change. This pursuit has led to a rapid adoption of many innovations. It should be expected then that the use of computers is compatible with the basic desire of the farm operator to improve production efficiency and cost effectiveness.

The third attribute which affects the rate at which innovations are adopted is complexity. The computer is obviously a complex technology. At first, this factor would seem to inhibit the rate at which the computer will be adopted because, generally, less complex innovations tend to be adopted more rapidly. However, complexity must be viewed from the perspective of the technology user and not from the viewpoint of the internal workings of the machine. A television set is a good example. It is a highly complex innovation, but all the user must do to operate it is to plug it into an electrical outlet, turn it on, and adjust the channel selector. Computers are becoming more simple to operate. As more efforts to simplify the operation of computers are successful, the complexity of computers will decline as an inhibitor to adoption.

A fourth characteristic of an innovation is its trialability. If an adoption can be tried on a relatively small scale, it is likely to

be adopted at a faster rate than if large-scale trials have to be conducted. New hybrid varieties or pesticides can be tried on one field and their performance evaluated. Such divisible innovations are likely to be adopted relatively quickly. Adoption of a system which is not as divisible, though, is likely to be delayed because of its large-scale nature. Farm computers at first seem to fit into the large-scale category. However, the amount of money required to start using this technology is relatively small, particularly for moderate or large-sized farms. Also, efforts have been made for some farmers to try computers on a no-cost, no-obligation basis at such places as local elevators or Extension offices.

The final characteristic is observability. If the effects of a particular innovation can be judged by watching its performance on a neighboring farm or on a demonstration plot, the rate of adoption of that technology will be increased. Hybrid seeds, which had a dramatic and apparent effect on yields, were rapidly adopted. Observability is not a characteristic typically associated with computers, since they are usually housed in an office and used in private. Thus, the lack of direct observability is going to retard the adoption of farm computers. However, the effects of the farm computer may be observed if the performance of farm operators is improved. Also, today's farmer tends to seek out information about new technologies. Thus, the direct observability factor may be less important today than it was two or three decades ago. Furthermore, many small computer groups have been formed so that members can share ideas and experiences (Sonka, 1983).

Iowans and computer technology

During the next few years, the computer will undoubtedly become an integral part of the management process on many commercial farms. Many of the characteristics of the computer make it an attractive innovation for adoption by farmers. As an educational agency charged with the responsibility of improving the quality of life of the agricultural segment of our society, and being an integral component in the diffusion process, Extension must remain on the forefront of computer technology.

Iowans are already into the adoption process in the microcomputer area. A study conducted in 1984 in Iowa by Louis Harris and Associates (Elbert, 1984) indicated that about one-third of all Iowans can be considered computer literate. The study also showed that one in three Iowa farmers knows how to use a computer and about half that many say they use computers in their work. The implication here is that the Iowa Cooperative Extension Service, in order to maintain or expand its clientele base, must become and continue to be a leader in microcomputer technology, especially in the agricultural area.

Review of Research

Research has been extensive during the past several years concerning the advent of computer-assisted instruction (CAI), computer-managed instruction (CMI), computer-based instruction (CBE), and other such efforts to incorporate computers into educational curricula. There have also been evaluative studies of various computer-related programs. The majority of the research, however, has focused primarily on student use or clientele use. Very little reported research has dealt with

the educator. In fact, the educators' needs have in many cases been overlooked, yet these professionals are expected to be competent in this new technology (Cantrell, 1982).

There are, however, some studies that focused primarily on Extension professionals in the microcomputer area. A descriptive study of Mississippi Cooperative Extension Service and Mississippi Vocational Agriculture professionals was conducted at Mississippi State University by Cantrell in 1982. She found that only 26.5 percent of the 309 participants studied had previously used a microcomputer. Only 10.9 percent had access to a microcomputer (Cantrell, 1982).

Cantrell also questioned participants as to their perception of how microcomputers should be used in their job. The use rated as having the greatest utility to Extension professionals was for mailing list purposes, which is an office management use.

In relation to future microcomputer training, Cantrell found that 75.5 percent of the participants indicated that training should be on a voluntary basis and approximately 63 percent indicated that training should be the primary responsibility of the individual. Such a finding seems inconsistent with Extension's policy of providing staff education considered necessary for the accomplishment of Extension's goals and objectives.

The three highest rated needs of Extension personnel identified by Cantrell were:

1. The ability to incorporate microcomputers into the participant's individual job performance activities.

2. The ability to run packaged programs.
3. A knowledge of the uses that microcomputers can provide the individual (Cantrell, 1982).

All three needs indicated that Mississippi Extension and vocational agriculture educators recognized that microcomputers were useful in agricultural education and that more knowledge about microcomputer technology would be beneficial. The objectives of this study were to determine if similar attitudes and needs existed among Iowa Extension educators.

In a paper presented at the Tenth Annual National Agricultural Education Research Meeting in Anaheim in 1983, Cantrell and Byler recommended that teacher educators assume a more active role in providing agricultural educators with microcomputer training opportunities (Cantrell and Byler, 1983). Such a recommendation seems contrary to Cantrell's finding that training should be the primary responsibility of the individual.

Bowen (1984) used a modified Delphi technique to develop a list of microcomputer competencies needed by Cooperative Extension Service agents and vocational agriculture teachers in Mississippi. His two conclusions dealing with Extension agents were:

1. The essential competencies needed by county-level Extension agents in Mississippi fall into the categories of agricultural and Extension applications, awareness, and literacy.
2. Programming skills are not a major part of the microcomputer competencies needed by Extension experts in Mississippi.

Bowen made two recommendations concerning Extension agents based upon his findings and those of Cantrell:

1. Students preparing to become Extension agents in Mississippi should be provided the experiences necessary for them to acquire the 25 competencies deemed most essential by the panel of consultants. The competencies should be acquired through required courses.
2. Current county-level Extension agents should be required to acquire the 25 most essential competencies through appropriate in-service training activities conducted by the Mississippi Cooperative Extension Service Computer Applications and Services Department and through appropriate credit courses available through Mississippi State University.

In 1983, Hudson conducted a study in Virginia of vocational agricultural instructors and the competencies needed to utilize microcomputers in their work. The competencies were identified in four areas: (1) general, (2) programming, (3) hardware, and (4) software. He found that competencies related to actual software and hardware were more likely to be considered highly important than those related to programming. He recommended replication of the study in the Agricultural Extension component of agricultural education (Hudson, 1983). Though not a replication, this study focused on the population and area that Hudson suggested, but in Iowa instead of Virginia.

Foster and Miller conducted a study in 1983 dealing with the competencies needed by vocational agriculture instructors in Nebraska

and Iowa. They found that the barriers most often cited as being prohibitive factors in the use of microcomputers were expensive software, lack of computer teaching materials, and lack of operational knowledge (Foster and Miller, 1984). No study has been done to determine if similar barriers exist among Iowa Cooperative Extension Service personnel. Two of the objectives of this study, however, were to determine computer experiences and training and current educational and management use of microcomputers by Iowa Extension personnel.

Summary

The literature indicates that the future will involve increased use of microcomputers to meet farming, homemaking, and general family needs (Lambrecht and McClellan, 1982) (Lanpher, 1980). The ability to use a computer is now considered a basic skill (Luehrmann, 1983), but the adoption of computer technology by an organization such as the Iowa Cooperative Extension Service must be handled carefully (Emmett, 1983).

The agricultural sector of our society has been relatively quick to adopt productive technologies. The computer is proving to be such an innovation (Sonka, 1983). Iowans are adopting the computer at a fairly rapid rate (Elbert, 1984).

Several studies dealing with Cooperative Extension Service personnel indicate that microcomputers are being utilized, but problems exist in the hardware, software, and training areas (Cantrell, 1982; Hudson, 1983). Microcomputer training is an area needing attention in Cooperative Extension work.

No study has been conducted in Iowa concerning the attitudes of Iowa Cooperative Extension Service professionals towards microcomputers and their relationship to accomplishment of Extension goals and objectives. Such information is needed to help establish long- and short-range goals for hardware and software procurement and for microcomputer training programs. The microcomputer will be an integral component in the future of Cooperative Extension work. An understanding of the current attitudes of Extension personnel toward microcomputer technology is imperative.

METHODS AND PROCEDURES

This chapter presents the methods and procedures that were followed in conducting this study. The procedures are divided into five categories: (1) research design, (2) population investigated, (3) instrumentation, (4) data collection, and (5) statistical analyses.

Research Design

This investigation was designed to be of a descriptive nature. The primary objective of descriptive research is to determine the nature of prevailing conditions, practices, and attitudes by seeking accurate descriptions of activities, objects, processes, and persons. Other objectives include identification of problems, justification of current conditions and practices, making comparisons and evaluations, and determining what others are doing with similar problems or situations (Van Dalen, 1979; Isaac and Michael, 1972).

Population Investigated

The population for this study consisted of all professional employees of the Iowa Cooperative Extension Service at the county and area levels in January, 1984. Potential respondents were from all 99 counties and all 12 areas, consisting of a total of 317 personnel. Those studied were grouped into four categories: Extension Agriculturists, Extension Home Economists, Extension 4-H Youth Leaders, and Area Specialists.

Instrumentation

In order to gather the data for this study, permission was obtained from the Department of Journalism and Mass Communication at Iowa State University to utilize data collected in January and February of 1984 through the Agricultural and Home Economics Experiment Station Project 2514. This was the second data base of a longitudinal study started in 1981 designed to determine the impact of computer-based information technologies on the Iowa State University Cooperative Extension Service.

The questionnaire used in the 1982 survey was reviewed for content validity by a panel of experts on the Iowa State University campus. The panel consisted of Dr. Robert W. Jolly, Associate Professor of Economics; Dr. Vivan M. Jennings, Associate Director of the Iowa Cooperative Extension Service; Dr. Barbara A. Woods, Assistant to the Director, Iowa Cooperative Extension Service; and Dr. J. Paul Yarbrough and Dr. Clifford Scherer, Professors, Journalism and Mass Communications. Based upon results of the 1982 survey, appropriate revisions were made in the questionnaire for the 1984 study. The questionnaire, as approved by the Human Subjects Committee, appears in Appendix A.

Several different scales were used in the 32-question instrument. Questions 1 and 3 used a Likert-type scale with numerical values as follows: 5-Strongly Agree; 4-Agree; 3-Don't Know; 2-Disagree; and 1-Strongly Disagree. Question 1, used to secure data for Hypotheses 1a, 1b, and 1c, dealt with the attitudes of the respondents toward microcomputers. Question 3 asked the opinion of Extension professionals as

to which role Extension should emphasize in serving clients' computer needs.

Question 2, also used to secure data for Hypotheses 1a, 1b, and 1c, used a Likert-type scale with the following numerical values: 4-Extremely Useful; 3-Quite Useful; 2-Somewhat Useful; and 1-Of Little or No Use. This question also dealt with the attitudes of the respondents towards microcomputers.

Several questions requested data on a dichotomous (Yes-No) scale. The number of the question and kind of information requested was: 4-Computer equipment available for use; 5 and 8-Procurement of a computer for home or office; 11-Use of a computer during the past year; 18-Receipt of computer publications; and 22-Type of microcomputer training desired. The data collected in Question 22 were used to test Hypotheses 2a, 2b, and 2c.

Categorical data were collected in four of the questions. Questions 12 (frequency of computer use for listed purposes) and 13 (frequency of performing listed functions) used a None, 1-2, 3-9, 10-19, 20-49, and 50+ scale. Question 17 (frequency of use of listed sources to obtain information about computers) used a Never, Once, Two Times, Three Times, or Four or More Times scale. Question 19 (number of hours of computer training) had a None, 1/2 day or less, 1 day, 2 days, 3 days, 4 days, 5 days, or More than 5 days response scale.

Five questions (14-16 and 25-26) collected continuous data which were later categorized by the researcher. The five questions, respectively, requested information on how many different computer

programs were used at least once, the number of times the respondent ran a computer analysis for clientele, the number of people who used a computer program under the respondent's direction or assistance during the past 12 months, membership in professional organizations, and involvement in listed roles and activities.

Likert-type scales were used for Questions 20 and 21 as follows: 4-Extremely Useful; 3-Quite Useful; 2-Somewhat Useful; and 1-Of Little or No Use. Question 20 collected information on the perceived usefulness of microcomputer training by computer dealers, Cooperative Extension, community colleges, or others. Question 21 dealt with the perceptions of the usefulness of the training in performing different tasks with the microcomputer.

Question 23 requested a ranking of several forms of microcomputer training. The choices were credit classes held off-campus, credit classes held on-campus, in-service education, self-study materials, and other. Data collected by this question were used to test Hypotheses 2a, 2b, and 2c.

The degree of job satisfaction was the concern of Question 24. The scale was a Likert-type scale with values assigned as follows: 5-Very Satisfied; 4-Satisfied; 3-Neutral; 2-Dissatisfied; and 1-Very Dissatisfied.

Questions 27-36 were designed to collect demographic data. The data were grouped to use in testing hypotheses.

The Cronbach Alpha procedure was used for post hoc reliability testing. This procedure was used on Questions 1 and 2 (attitudes) and

Questions 22 and 23 (perceptions of training). The coefficient derived from this procedure was considered an estimation of the instrument's reliability (Travers, 1978). The following coefficients were computed: Question 1-.66; Question 2-.76; Question 22-.96; and Question 23-.76. Since all the coefficients were above .60, they were considered adequate for the purposes of this study.

Data Collection Procedures

Each questionnaire was numerically coded to provide for confidentiality and ease of classifying the data. The initial mailing, including the instrument and cover letter, was made on January 25, 1984. The cover letter (see Appendix B) explained the purpose of the research and solicited participation. Initially, 244 responded, representing 76.97 percent of the total.

Due to the high rate of return of the initial response group, the research staff decided upon an informal follow-up instead of a formal second mailing. This was accomplished through an announcement in the Green Sheet, an informational, one-page weekly letter sent to all County Extension Directors and Area Directors. The follow-up response group (received February 10-29) consisted of 10.73 percent (N=34) of the total.

The population consisted of 100 County Extension Directors, 55 4-H and Youth Leaders, 65 Home Economists, and 85 Area Specialists. There is a slight discrepancy between the group totals and the total from the mailing list, which could be accounted for by delays in updating

the mailing list or by including on the mailing list personnel from other parts of Extension.

A simple t-test was utilized to determine if significant differences existed between the original and follow-up respondents. No significant differences were discovered; therefore, the groups were combined.

Statistical Analysis

Responses were coded as the questionnaires were received. The data were stored on a microcomputer diskette and then transferred to the mainframe computer at Iowa State University. SPSSx (SPSSx: User's Guide, 1983) was used for statistical analysis. The .05 level of significance was set as the critical value.

Statistical analysis was accomplished as follows:

1. Frequencies were calculated to verify the data.
2. A t-test was utilized to determine significant differences between the original and follow-up respondents.
3. Appropriate descriptive and inferential statistical procedures were applied to test the stated hypotheses. Statistical techniques included analysis of variance and t-tests (to test for significant differences among attitude means item by item and question by question) and chi-square test for independence in relation to perceptions of training. In addition, the multiple regression technique was used to determine if attitudes could be predicted based upon the independent variables.

FINDINGS AND DISCUSSION

The purpose of this chapter is to present and explain information pertaining to the collected data and report the findings of this study. Because the study was descriptive in nature, a general description of the participants is presented first, according to selected individual characteristics and then microcomputer use and training. Next, for clarification, findings are presented according to the specific research questions investigated. Finally, a discussion of the findings, including possible causes and implications, is presented.

Demographic Data

The primary intent of a descriptive study is to describe existing conditions and draw inferences for conclusions and recommendations. Participants were asked, therefore, to respond to several questions that described their present personal and employment characteristics, previous microcomputer use, and training opportunities.

Position

The distribution of the 278 Extension professionals who participated in the study is shown in Figure 1. The group was composed of 92 (33.7 percent) Extension Agriculturists, 54 (19.8 percent) Home Economists, 41 (15.0 percent) 4-H Youth Leaders, and 83 (28.6 percent) Area Specialists. Those identified as Area Specialists may be either subject-matter specialists or administrative personnel. The Extension Agriculturists category contained those who identified themselves as a CED on the data collection instrument, which means that two Home

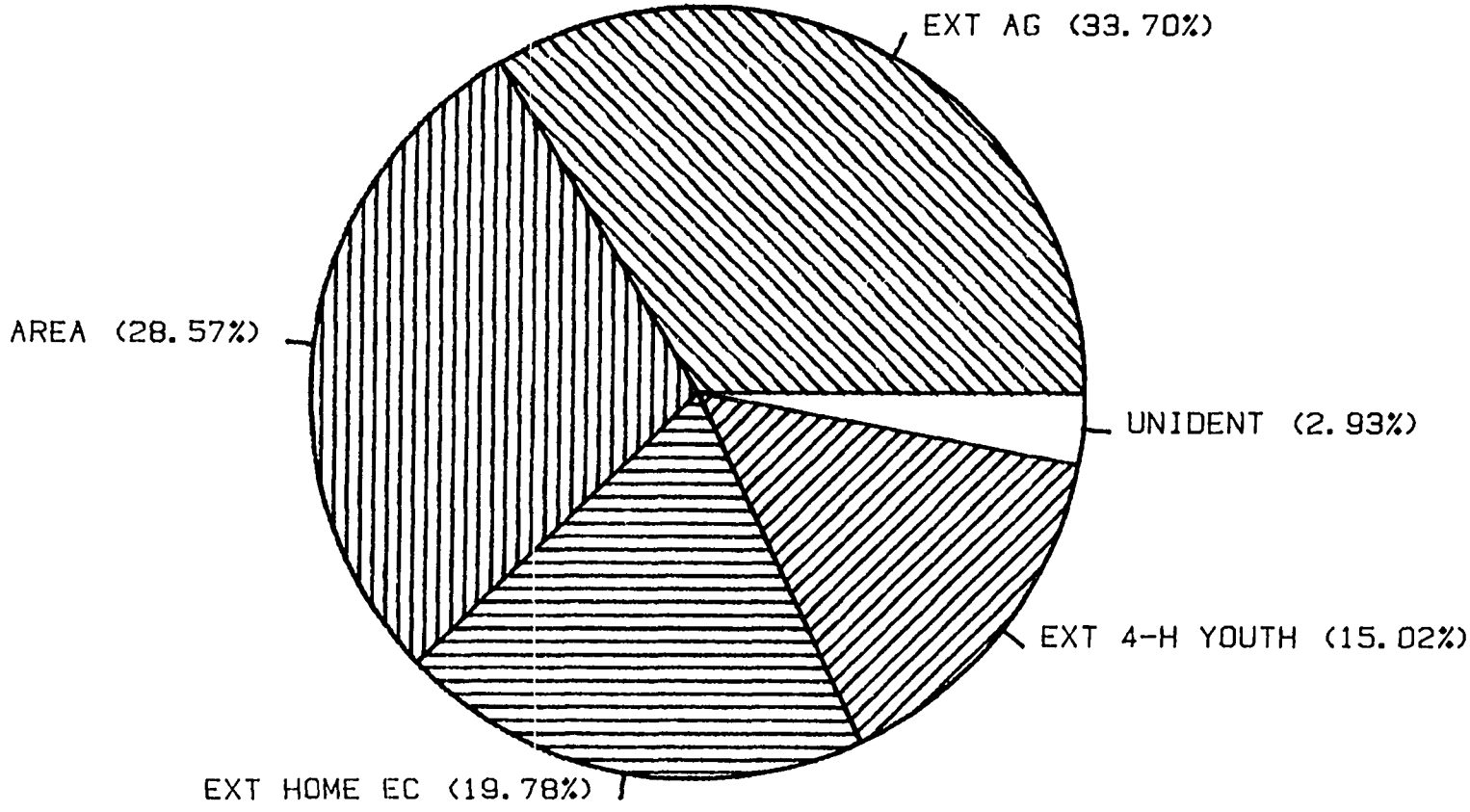

Figure 1. Distribution of participants by areas of responsibility (N=278)

Economist/CEDs could have been included in the Extension Agriculturist category and not identified as Extension Home Economists.

Length of employment

Participants were asked to respond to the length of employment on a categorized scale. The data are in Figure 2. The largest group was in the 11 to 20 years of service category, with almost 25 percent.

Figure 2 also indicated that over half those surveyed (51.8 percent) had been employed by the Iowa Cooperative Extension Service for 10 years or less. A total of 59 (21.2 percent) had served more than 20 years. This was consistent with the data collected concerning age, where 25.5 percent were 51 years old or older (see Figure 4).

Educational level

The educational level of the participants was classified into five categories. The largest group was those who had completed a master's degree, with more than 51 percent (N=143) of the total. (See Figure 3.) There were 71 (25.5 percent) who held a bachelor's degree and 49 (17.6 percent) who were actively working toward a master's degree. Only eight (2.9 percent) of the respondents had completed a doctorate degree, while four (1.4 percent) were working toward this advanced degree.

The combination of those with a bachelor's degree plus those who were working on their master's totaled 120. This figure was compatible with the data collected on age (Figure 4), where those in the 18-30 and 31-40 age groups totaled 129. The minimum educational requirement for county-level positions was the bachelor's degree. Iowa Extension

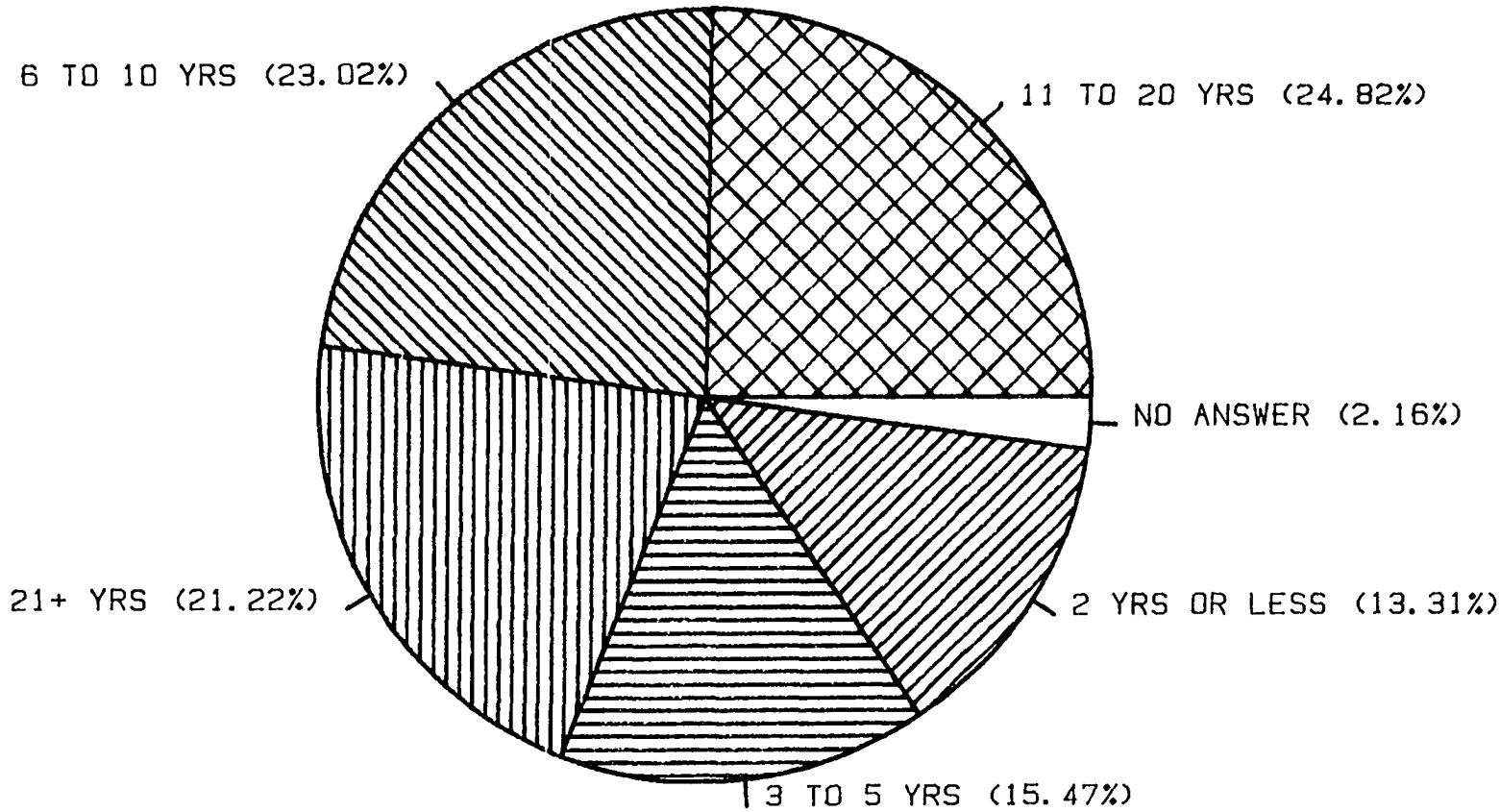

Figure 2. Distribution of participants by length of Extension employment (N=278)

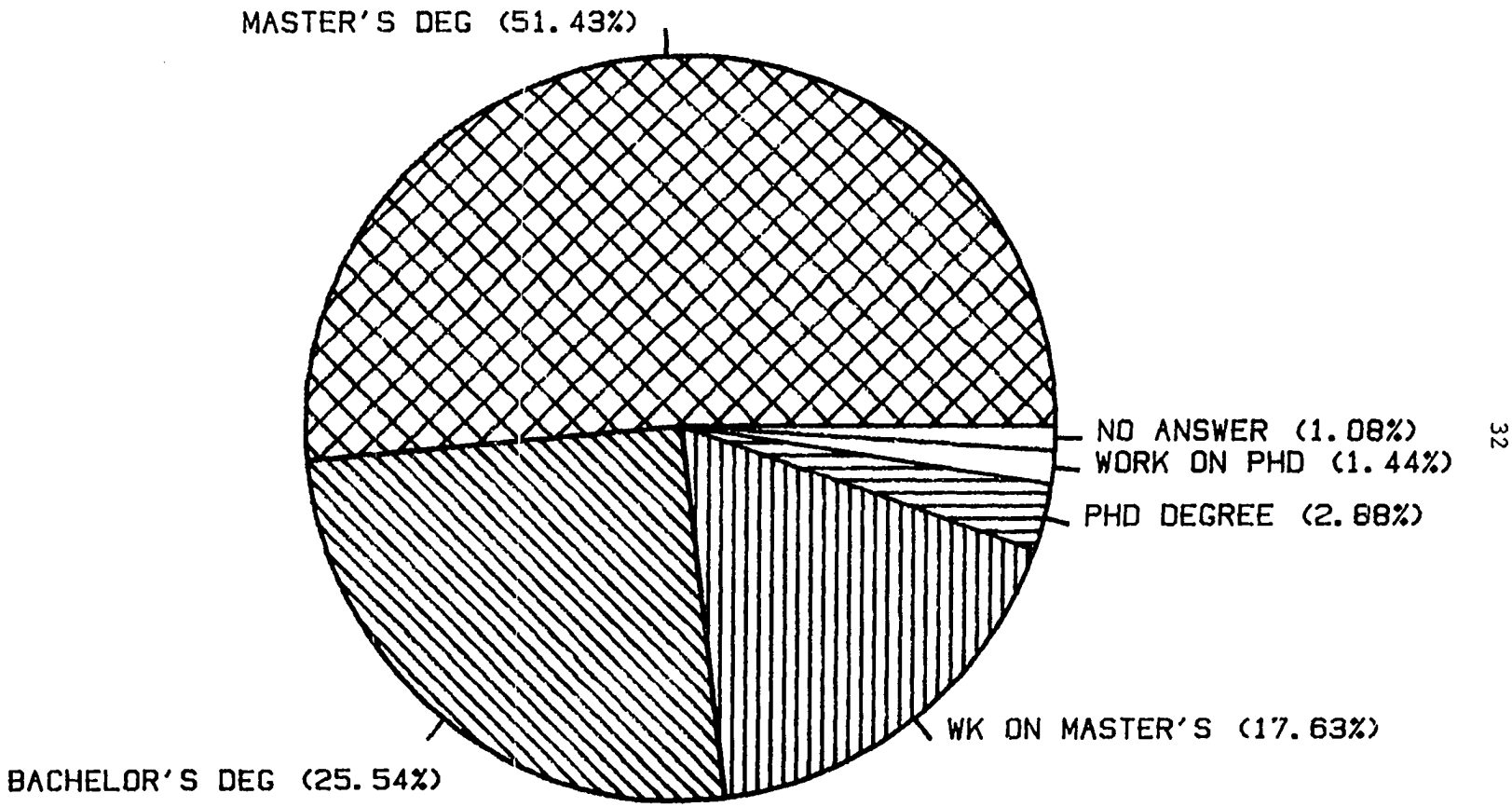

Figure 3. Distribution of participants by educational level (N=278)

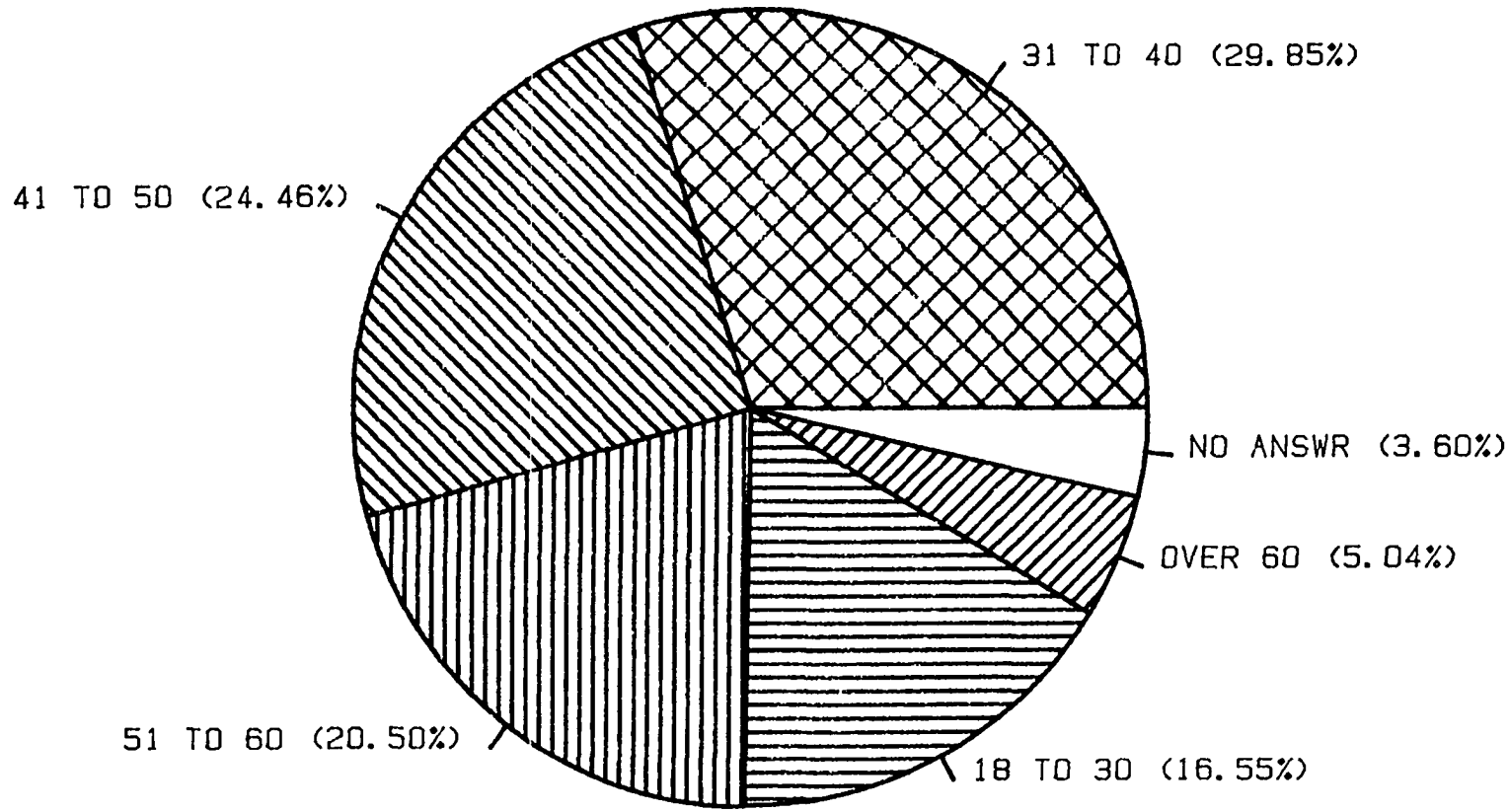

Figure 4. Distribution of participants by age (N=278)

policies provide encouragement for additional formal education, which may help explain the possible relationship between age and educational degree obtained. Official policy states that staff members employed after October 1, 1977, are required to have an earned master's or higher degree within eight years from employment date. Those employed prior to October 1, 1977, who have not earned a recognized master's degree are required to complete a minimum of five semester hours of course work every three years. Also, those who have earned a recognized master's or higher degree are required to complete a minimum of three semester hours of course work or other approved professional improvement activities such as research or special independent study every five years (Personnel Training and Development Policies, 1982).

Age

The age of the participants was divided into five groups. The largest group was the 31-40 group, with almost 30 percent (N=83), while the smallest, with 5.0 percent (N=14), was the over 60 group. Figure 4 indicates a fairly balanced division among the four largest groups, with 46 (16.6 percent) aged 18-30, 83 (29.9 percent) aged 31-40, 68 (24.5 percent) aged 41-50, and 57 (20.5 percent) in the category of 51-60 years of age.

Sex

Almost 60 percent (N=165) of the participants were male. The 107 (38.5 percent) females were composed of 54 Home Economists plus two CEDs and several 4-H Youth Leaders and Area Specialists. This is

consistent with reported male-female ratio of all field staff in Iowa Extension, which is currently 42.8 percent female and 57.2 percent male (Goering, 1984).

Previous computer use

A majority (N=249) of the participants reported that they had used a microcomputer at least once during the previous year. Only 24 indicated they had not used one, while five did not answer. This means that almost 90 percent of Iowa Extension personnel at the area and county levels had used a computer at least once during the 1983 year. (See Figure 5.)

There is a possible slight discrepancy between these data and data collected concerning microcomputer training received (Figure 6). Only 3.2 percent indicated that they had not received any training on microcomputers. Most microcomputer training sessions involve at least a minimal amount of hands-on experience, which indicates that possibly a greater number had actually used a microcomputer at least once during the previous year. The possible discrepancy could be in the interpretation of the question dealing with previous microcomputer use.

Perceptions of the usefulness of microcomputer training received

Question 21 asked respondents to indicate on a Likert-type scale the usefulness of the microcomputer training they received during the past year. "Feeling more competent in using computers" ranked highest, with a mean of 2.97 (on a scale of 1 to 4, where 1 = Of Little or No Use

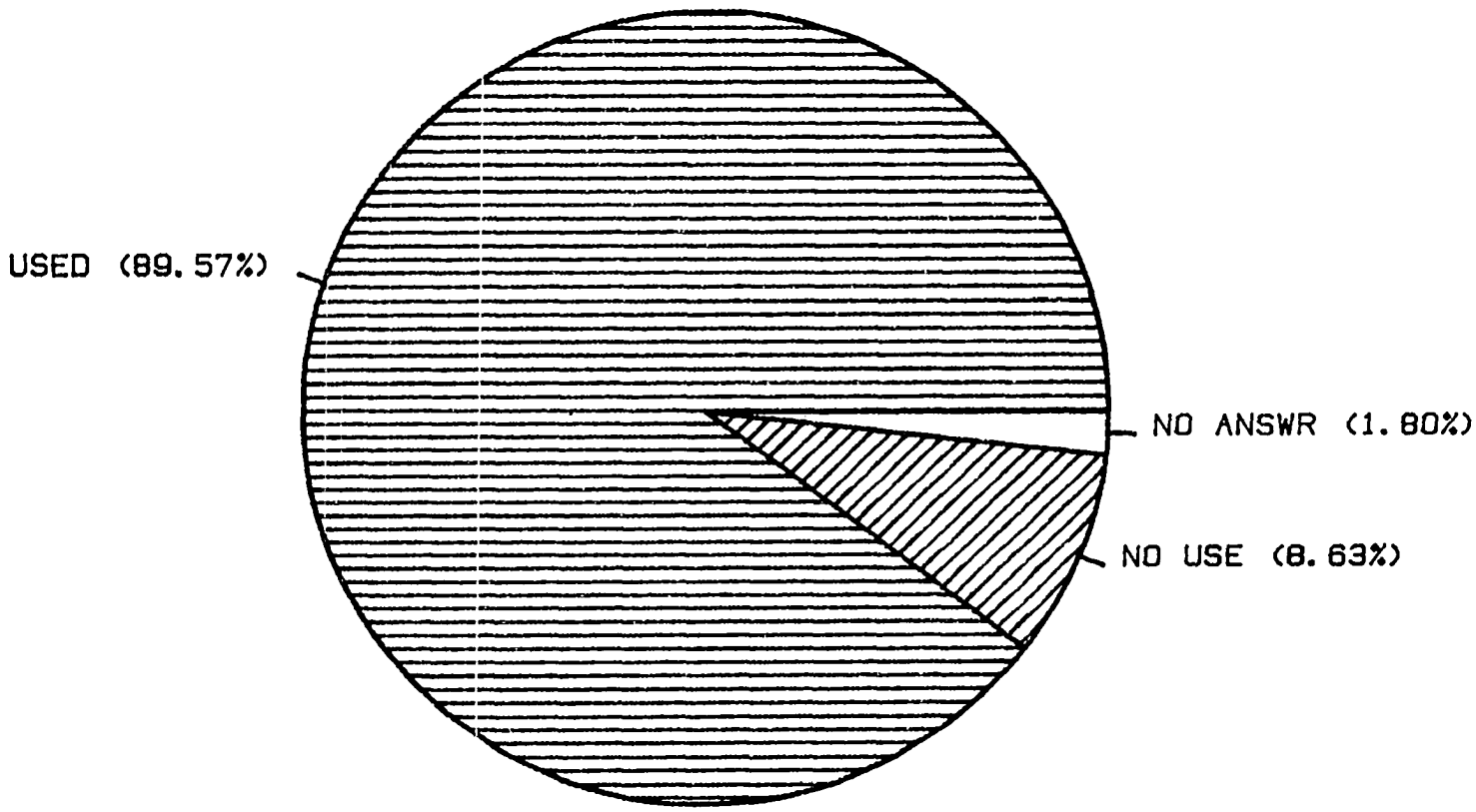

Figure 5. Distribution of participants by computer usage (N=278)

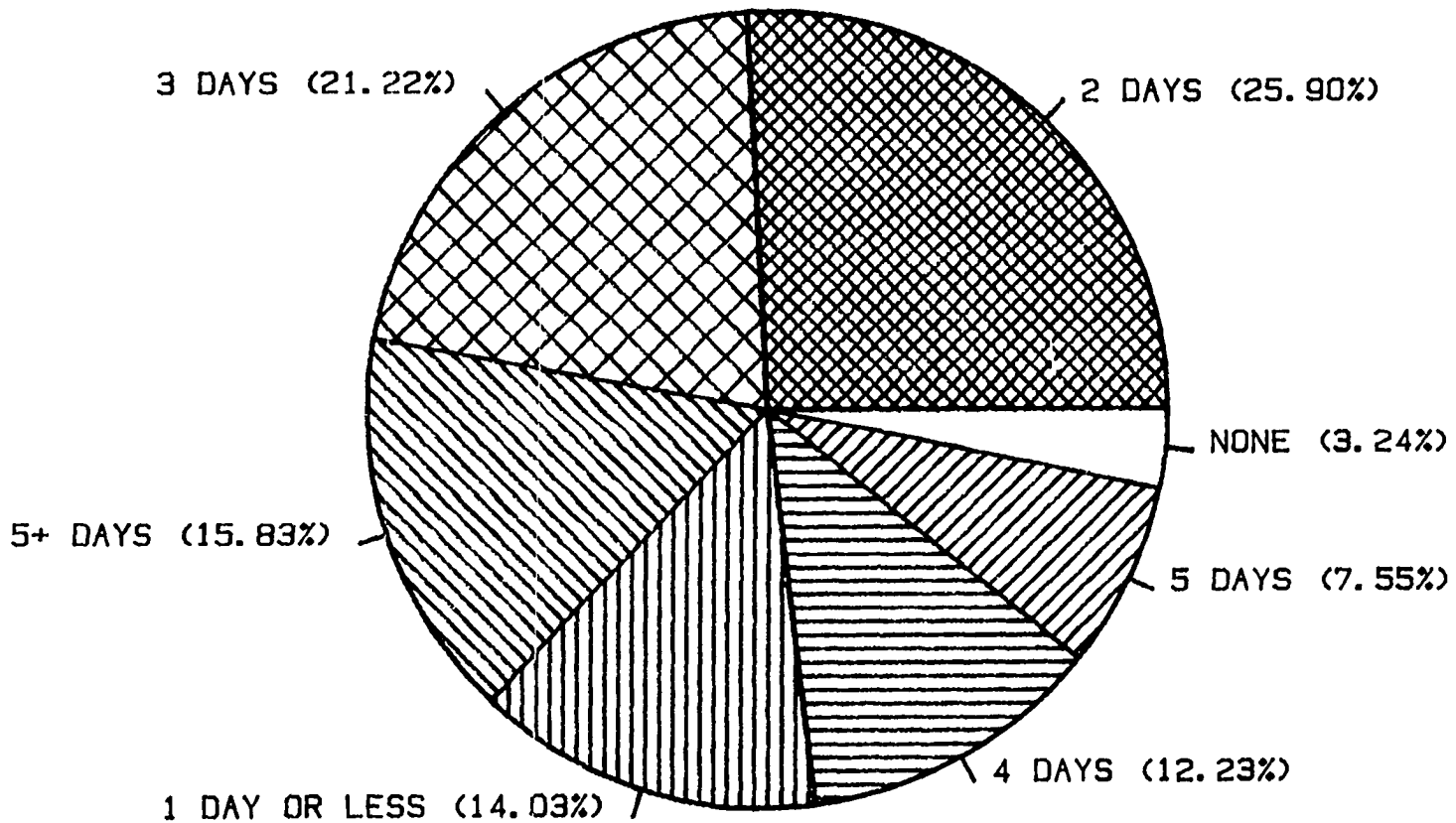

Figure 6. Distribution of participants by amount of microcomputer training received (N=278)

and 4 = Extremely Useful). "Developing new programs" ranked lowest, with a mean of 1.69. The data are presented in Table 1.

Since 74.8 percent (see Figure 7) of those who received microcomputer training during the past year received it from the Iowa Cooperative Extension Service, the data in Table 1 indicate that the training was successful in increasing the feeling of competence of Iowa Cooperative Extension Service personnel in the use of microcomputers. Only 29.2 percent (N=81) felt that the training was quite useful or extremely useful in helping personnel use computers in new ways to aid clients. This was an expected result, since the training was designed for computer awareness, not in-depth operation. Assistance for personnel in using computers in new ways for office management had a mean of only 2.27, with 21.9 percent (N=59) answering quite useful or extremely useful.

Frequency of use

Table 2 presents the data collected in response to several questions concerning office and educational use of microcomputers, number of software programs used, and number of clientele reached using the microcomputer. The most popular specific use was in analyses for clients, and the least popular was in securing other states' materials.

More than half (51.8 percent) indicated that they used between three and nine different software programs during the past year. More than 90 percent (N=251) used some type of software program during the year. Fifty-three percent used a computer to prepare for instruction at least once. An estimate of the number of clients contacted

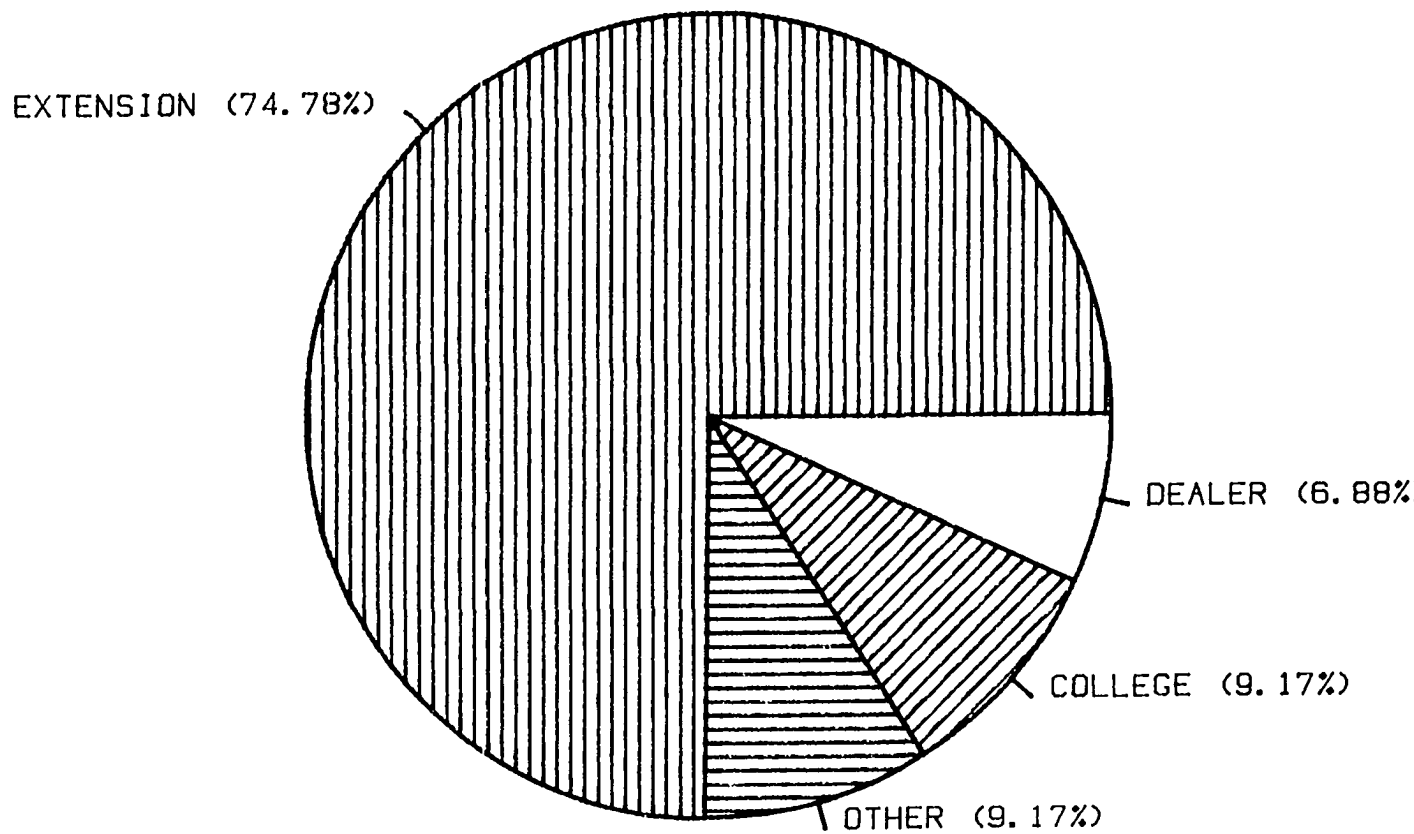

Figure 7. Distribution of participants by sources of microcomputer training received (N=278)

Table 1. Perceived value of microcomputer training received (N=278)

Type of use	$\bar{X}$	Of little or no use (% of N)	Somewhat useful (% of N)	Quite useful (% of N)	Extremely useful (% of N)	No answer (% of N)
Feel more competent using computers	2.97[a]	14 (50)	94 (33.8)	105 (37.8)	55 (19.8)	10 (3.6)
Assisting fellow workers using computers	2.48	61 (21.9)	123 (44.2)	60 (21.6)	21 (7.6)	13 (4.7)
Use computers in new ways for office management	2.27	98 (35.3)	107 (38.5)	43 (15.5)	16 (5.8)	14 (5.0)
Use computers in new ways to aid clients	2.49	69 (24.8)	113 (40.6)	63 (22.7)	18 (6.5)	15 (5.4)
Develop new programs	1.69	215 (77.3)	32 (11.5)	9 (3.2)	7 (2.5)	15 (5.4)

[a]Scale = 1-4, where 4 = extremely useful.

Table 2. Frequency of specific computer use of respondents by number and percent (N=278)

Specific use	Times used						Missing (percent)
	None	1-2	3-9	10-19	20-49	50+	
Preparing for instruction	103[a] (37.1)[b]	44 (15.8)	60 (21.6)	21 (7.6)	12 (4.3)	7 (2.5)	31 (11.2)
Individual instruction	80 (28.8)	54 (19.4)	60 (21.6)	31 (11.2)	11 (4.0)	10 (3.6)	32 (11.6)
Analyses	57 (20.5)	46 (16.5)	50 (18.0)	39 (14.0)	33 (11.9)	28 (10.1)	25 (9.0)
Other ways for clients	122 (43.9)	34 (12.2)	45 (16.2)	20 (7.2)	15 (5.4)	7 (2.5)	35 (12.6)
Keep records	132 (47.5)	26 (9.4)	37 (13.3)	27 (9.7)	12 (4.3)	10 (3.6)	34 (12.3)
Prepare records	153 (55.0)	33 (11.9)	28 (10.1)	21 (7.6)	4 (1.4)	5 (1.8)	34 (12.3)
Prepare communication	145 (52.2)	22 (7.9)	25 (9.0)	24 (8.6)	14 (5.0)	15 (5.4)	33 (11.9)
Electronic communication	221 (79.5)	8 (2.9)	8 (2.9)	3 (1.1)	3 (1.1)	2 (.7)	33 (11.9)
Information networks data bases	208 (74.8)	12 (4.3)	16 (5.8)	4 (1.4)	2 (.7)	3 (1.1)	33 (11.9)

[a] Number

[b] % of N.

Table 2. Continued

Specific use	Times used						Missing (percent)
	None	1-2	3-9	10-19	20-49	50+	
Collect data	199 (71.6)	23 (8.3)	15 (5.4)	3 (1.1)	2 (.7)	4 (1.4)	34 (11.5)
Data tabulation	133 (47.8)	34 (12.2)	47 (16.9)	12 (4.3)	9 (3.2)	11 (4.0)	32 (11.5)
Predict trends in pricing	210 (75.5)	12 (4.3)	9 (3.2)	8 (2.9)	4 (1.4)	1 (.4)	34 (12.2)
Model building	225 (80.5)	6 (2.2)	5 (1.8)	3 (1.1)	2 (.7)	2 (.7)	35 (12.6)
Literature reviews	236 (84.9)	6 (2.2)	1 (.4)	0 (0.0)	0 (0.0)	0 (0.0)	35 (12.6)
Secure other states' materials	233 (83.8)	6 (2.2)	3 (1.1)	1 (.4)	1 (.4)	0 (0.0)	34 (12.2)
Budget office management	202 (72.7)	19 (6.8)	12 (4.3)	7 (2.5)	4 (1.4)	2 (.7)	32 (11.5)
Total computer use	11 (4.0)	14 (5.0)	32 (11.5)	32 (11.5)	39 (14.0)	84 (30.2)	66 (23.7)
Different software programs used	25 (9.0)	43 (15.5)	144 (51.8)	43 (15.5)	18 (6.5)	3 (1.1)	2 (.7)
Number of clients	45 (16.2)	13 (4.7)	32 (11.5)	34 (12.2)	42 (15.1)	61 (21.9)	51 (18.3)

through using microcomputers was not possible because of the method of data collection.

Table 2 indicates that microcomputers were being used by quite a number of the respondents. However, the category with the greatest number of responses for any specific use is the "None" category, which indicates that much improvement could be made in the amount of microcomputer usage.

Microcomputer training received

Only nine (3.2 percent) of the respondents indicated that they had not received any microcomputer training during the past year. The most common amount of training received was 2 days (25.9 percent). (See Figure 6.) More than a third (35.6 percent) had completed 4 days or more, and only 14.0 percent had completed one day or less. These figures implied that almost all personnel at the county and area levels had had introductory microcomputer training prior to 1984.

Sources of microcomputer training

The majority of the respondents who had received microcomputer training during the past year (N=261) received the training through Extension in-service education. Only 25 (9.2 percent) had received their training in college, and 6.9 percent (N=19) received their training through a computer dealer. Twenty-five also indicated training from other sources. Since the majority were Extension trained, the content of the training sessions could be determined to help plan future microcomputer training efforts. (See Figure 7.)

Perceptions of microcomputer training needed

In perceptions of microcomputer training needed, 187 (67.3 percent) indicated a need for training in the use of specific programs. There were 98 (35.3 percent) desiring training in the basics of computer operation, 48 (17.3 percent) in writing specific programs, and 33 (11.9 percent) in other forms of training. The data are presented in Figure 8. These data were later used to test the hypotheses of this study.

Form of microcomputer training desired

Respondents were asked to rank the forms of microcomputer training they desired. The most popular form was in-service education, with 106 (38.1 percent) respondents selecting it as first choice. Credit classes held off-campus was selected by 53 (19.1 percent) as first choice. The least-desired form of microcomputer training was credit classes held on-campus, with only six (2.2 percent) respondents selecting it as first choice. The data are presented in Table 3.

There is a high percentage of missing data in Table 3. In many instances, respondents only selected the form of microcomputer they most preferred and did not rank all choices as requested, which may account for some of the missing data. Also, many respondents did not answer the question at all, possibly because of the format of the question, which may have also contributed to the high percentage of missing data.

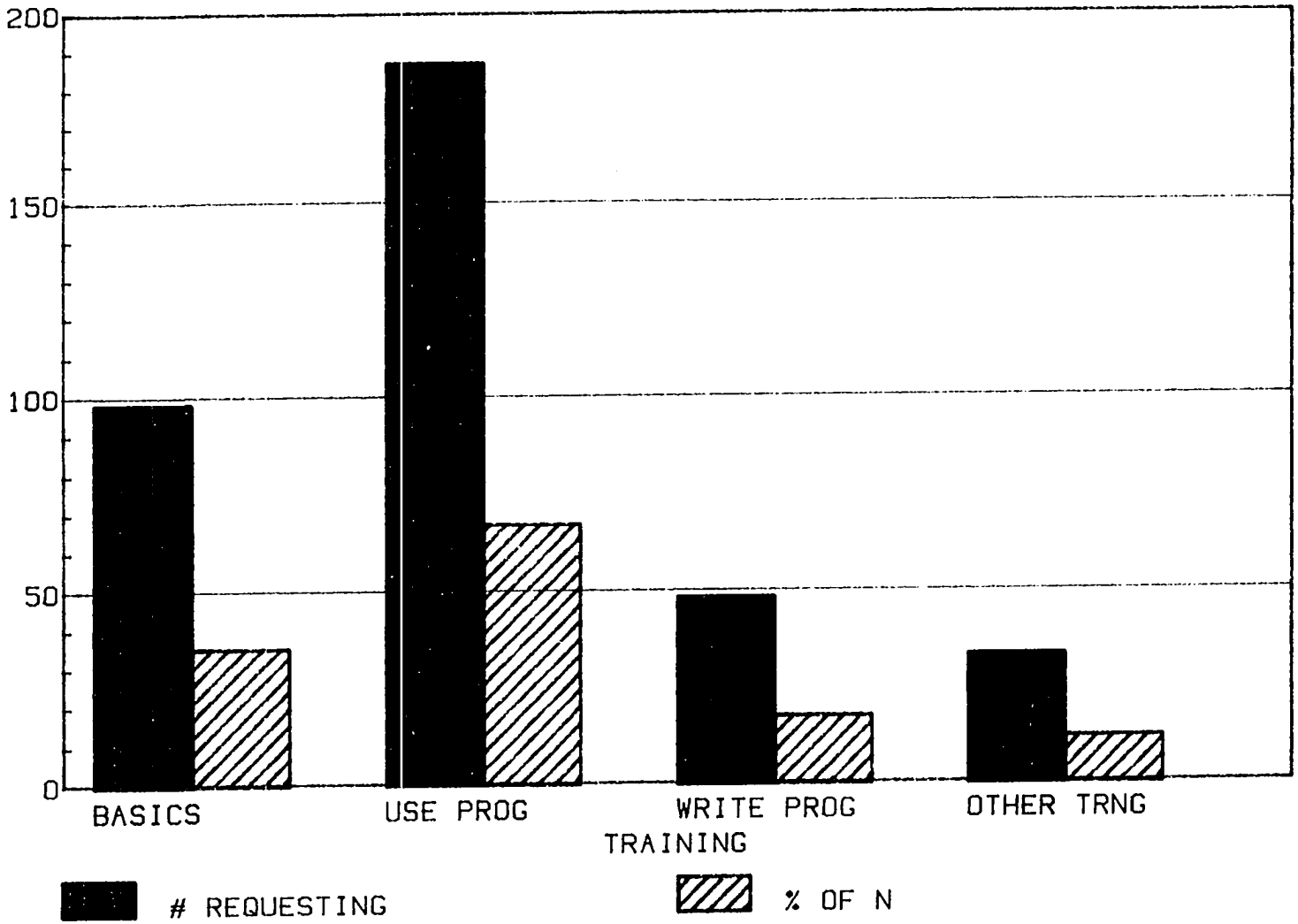

Figure 8. Respondents' perceptions of microcomputer training needed by number and percent (N=278)

Table 3. Percent and number of forms of desired training by first, second, and third choices (N=278)

Form	First choice (% of N)	Second choice (% of N)	Third choice (% of N)	Missing (% of N)
Credit classes held off-campus	53 (19.06)	19 (6.83)	17 (6.12)	189 (67.99)
Credit classes held on-campus	6 (2.16)	13 (4.68)	8 (2.88)	251 (91.28)
In-service	106 (38.13)	27 (9.71)	9 (3.24)	136 (48.92)
Self-study	26 (9.35)	31 (11.15)	20 (7.19)	201 (72.31)

Findings Relevant to Hypotheses

Attitudes by program areas of responsibility

The testing of the hypotheses dealing with attitudes of Extension personnel was accomplished using analysis of variance, t-tests, and chi-square analysis. Several different tests were necessary because of the variety of scales used in the data collection instrument. Question 1 used a 5-point Likert-type scale, and a 4-point scale was used in Question 2. A single mean was computed for each question.

Hypothesis 1a dealt with attitudes of Extension personnel toward the use of microcomputers in Extension work when grouped according to program areas of responsibility. The program areas were Agriculture, Home Economics, and 4-H.

An analysis of variance test was first used for each individual attitude statement. The results, presented for informational purposes, are in Table 4. Significant differences were found in attitude Statements 4 ("Unimproved programs will not benefit me") and 13 ("Have access to other states' programs"). The Scheffé procedure was used to determine where the differences were located. The difference ($p=.001$) in Statement 4 was between the Agriculturists and 4-H Youth Leaders. The difference ($p=.02$) in Statement 13 was between the Agriculturists and Home Economists.

The results of the testing of the next 13 attitude statements are presented in Table 5. Again, results of statement-by-statement testing were presented for informational purposes. Differences were noted in Statements 22 ("Show problem solutions at meetings"), 23 ("Run decision

Table 4. Analysis of variance of attitudes for Question 1, items 1-13, by program areas of responsibility (scale = 1-5)

Item	No.	Agri-culture	Home Economics	4-H	F	F-prob.
Computers will help me in Extension work	1	4.49[a] 0.55[b]	4.46 0.82	4.29 0.51	1.439	0.240
Computers will depersonalize relations	2	2.12 0.66	2.19 1.13	2.07 0.61	0.230	0.795
Can learn to use computers in more ways	3	4.57 0.50	4.72 0.76	4.61 0.49	1.230	0.295
Unimproved programs will not benefit me	4	2.22 0.86	2.52 1.26	2.95 1.04	5.501**	0.005
Easier to get information with computers	5	3.82 0.68	3.81 1.03	3.80 0.78	0.003	0.998
Will be by-passed if don't use computers	6	2.95 1.02	2.96 1.15	2.76 0.83	0.593	0.554
Want to learn more about using computers	7	4.52 0.70	4.54 0.84	4.34 0.69	1.009	0.367
Don't have computer -- difficult to operate	8	2.33 2.04	2.44 2.17	2.32 1.69	0.070	0.932

[a] $\bar{X}$.

[b] SD.

**Highly significant, $p < .01$.

Table 4. Continued

Item	No.	Agri-culture	Home Economics	4-H	F	F-prob.
Computers will cause centralized Extension	9	2.49 0.91	2.52 1.18	2.20 0.78	1.599	0.205
Want to develop computer materials	10	2.88 0.98	2.78 1.34	2.68 0.93	0.495	0.610
Computers will aid advantaged clients	11	2.76 1.16	3.17 1.53	2.66 1.06	2.413	0.092
Computer programs should be developed by teams	12	3.21 0.79	3.31 1.02	3.51 0.81	1.759	0.175
Have access to other states' programs	13	3.87 0.71 N=92	4.26 1.08 N=54	4.05 0.44 N=41	4.105*	0.018

*Significant, $p < .05$.

Table 5. Analysis of variance of attitudes for Question 2, items 14-26, by program areas of responsibility (scale = 1-4)

Item	No.	Agri-culture	Home Economics	4-H	F	F-prob.
Word processing applications	14	3.19[a] 1.06[b]	3.13 0.87	3.39 0.83	.941	.392
Keep financial administrative records	15	2.96 1.04	2.72 1.00	2.68 0.91	1.497	.227
Maintain mailing lists	16	3.61 0.68	3.61 0.66	3.65 0.57	.091	.913
Prepare visual aids	17	2.17 0.82	2.37 0.85	2.24 0.66	1.029	.359
Plan programs and schedule time	18	1.68 0.74	1.98 1.60	1.59 0.67	1.994	.139
Provide rapid access to information	19	3.08 0.65	3.11 0.69	3.05 0.80	.096	.909
Send receive mail within Extension	20	2.70 1.07	2.80 0.81	2.41 0.89	1.939	.147
Send receive mail outside Extension	21	1.95 1.07	2.15 1.19	1.71 0.68	2.107	.125
Show problem solutions at meetings	22	2.88 0.95	2.98 1.09	2.44 0.78	4.190*	.017

[a] $\bar{X}$.

[b] SD.

*Significant, $p < .05$.

Table 5. Continued

Item	No.	Agri-culture	Home Economics	4-H	F	F-prob.
Run decision aid programs for individuals	23	3.24 0.69	3.44 0.63	2.61 0.86	17.020**	.000
As clients' tool to learn computers	24	2.48 0.86	2.17 0.80	2.39 0.83	2.388	.095
Programmed instruction of clients-staff	25	2.61 1.03	2.63 0.76	2.49 0.78	.332	.718
Analytic support of education programs	26	3.05 0.60	3.15 0.71	2.56 0.78	10.148**	.000

**Highly significant, $p < .01$.

aid programs for individuals"), and 26 ("Analytic support of educational programs"). The differences, located by the Scheffé procedure, were between Home Economists and 4-H Youth Leaders in Statement 22 and between Agriculturists and 4-H Youth Leaders and Home Economists and 4-H Youth Leaders in Statements 23 and 26.

An examination of the data in Tables 4 and 5 indicated that county Cooperative Extension personnel had a positive attitude toward the use of microcomputers and were willing to learn more about using them in Extension work. There was also an indication that 4-H Youth personnel felt less positive about using computers in their work than did the other groups.

In Table 6, the data were presented after the negative attitude statements (2, 4, 6, 8, 11) in Question 1 were reversed and a weighted mean computed for each question. Question 2 had no statements to reverse before computing the weighted mean. A significant difference was found between Home Economists (mean=2.79) and 4-H Youth Leaders (mean=2.56). Hypothesis 1a, which stated that there were no significant differences in the attitudes of Extension personnel toward the use of microcomputers in Extension work when grouped according to areas of responsibility, was rejected. It was concluded that attitudes of Extension personnel toward the use of microcomputers in Extension work vary according to area of responsibility.

Table 6. Analysis of variance of weighted means for attitude Questions 1 and 2 by program areas

	Agri-culturist	Home Economist	4-H	F	Prob.
Question 1 - Attitudes towards usefulness of computers in Extension work[c]	3.25[a] .36[b]	3.36 .84	3.25 .29	0.922	.397
Question 2 - Attitudes towards potential applications of computers in Extension work[d]	2.74 .45	2.79 .45	2.56 .42	3.508*	.032
	N=92	N=54	N=41		

[a] $\bar{X}$.

[b] SD.

[c] Scale = 1-5.

[d] Scale = 1-4.

*$p < .05$.

Attitudes by level of assignment

Hypothesis 1b stated that there were no significant differences in the attitudes of Extension personnel toward the use of microcomputers when grouped according to level of assignment. T-tests were used to test for differences between area and county personnel. The statement-by-statement data are presented in Tables 7 and 8. Highly significant differences were found between the two groups in Statements 8 ("Don't have computer -- difficult to operate") and 10 ("Want to develop computer material") in Table 7. Statements 15 ("Keep financial administrative records"), 16 ("Maintain mailing lists"), 17 ("Prepare visual aids"), and 26 ("Analytic support of educational programs") in Table 8 indicated significant differences.

The weighted means for Hypothesis 1b are shown in Table 9. No significant differences were found, even though the means of the county group were slightly higher in both cases. Hypothesis 1b was not rejected. It was concluded that the attitudes of Extension personnel towards the use of microcomputers in Extension work are not significantly different when grouped by areas of responsibility.

Attitudes by length of service

The demographic variables selected in Hypotheses 1c and 2c were length of Extension service, educational level achieved, age, and sex. To facilitate discussion, they were abbreviated to service, education, age, and sex.

The results of analysis of variance tests on the first 26 attitude statements by service are shown in Tables 10 and 11. Only one

Table 7. T-tests of attitudes for Question 1, items 1-13, by levels of assignment (scale = 1-5)

Item	No.	County	Area	t-value	Prob.
Computers will help me in Extension work	1	4.43[a] 0.633[b]	4.47 0.631	-0.53	0.59
Computers will depersonalize relations	2	2.14 0.816	2.02 0.698	1.11	0.266
Can learn to use computers in more ways	3	4.62 0.584	4.47 0.570	1.91	0.057
Unimproved programs will not benefit me	4	2.49 1.29	2.22 1.04	1.88	0.062
Easier to get information with computers	5	3.82 0.808	3.78 0.856	0.35	0.729
Will be by-passed if don't use computers	6	2.90 1.013	2.76 0.983	1.09	0.276
Want to learn more about using computers	7	4.49 0.735	4.34 0.686	1.59	0.114
Don't have computer -- difficult to operate	8	2.37 2.020	1.83 1.113	2.87**	0.004

[a] $\bar{X}$.

[b] SD.

**Highly significant, $p < .01$.

Table 7. Continued

Item	No.	County	Area	t-value	Prob.
Computers will cause centralized Extension	9	2.44 0.968	2.20 0.880	1.87	0.063
Want to develop computer materials	10	2.82 1.073	3.22 1.048	-2.87**	0.004
Computers will aid advantaged clients	11	2.86 1.267	2.95 1.136	-0.56	0.576
Computer programs should be developed by teams	12	3.31 0.867	3.39 1.091	-0.54	0.591
Have access to other states' programs	13	4.02 0.806	4.14 0.871	-1.15	0.253
		N=195	N=83		

Table 8. T-tests of attitudes for Question 2, items 14-26, by levels of assignment (scale = 1-4)

Item	No.	County	Area	t-value	Prob.
Word processing applications	14	3.20[a] 0.950[b]	3.10 0.945	0.83	0.405
Keep financial administrative records	15	2.88 1.085	2.39 1.333	3.00**	0.003
Maintain mailing lists	16	3.63 0.641	3.14 1.014	4.00**	0.000
Prepare visual aids	17	2.25 0.802	2.84 0.876	-5.48**	0.000
Plan programs and schedule time	18	1.75 1.041	1.86 0.843	-0.85	0.394
Provide rapid access to information	19	3.07 0.697	3.01 0.862	0.51	0.611
Send receive mail within Extension	20	2.68 0.960	2.72 1.203	-0.31	0.758
Send receive mail outside Extension	21	1.95 1.032	2.01 1.142	-0.42	0.667

[a] $\bar{X}$.

[b] SD.

**Highly significant, $p < .01$.

Table 8. Continued

Item	No.	County	Area	t-value	Prob.
Show problem solutions at meetings	22	2.81 0.974	2.78 0.963	0.21	0.831
Run decision aid programs for individuals	23	3.17 0.771	3.18 0.965	-0.10	0.923
As clients' tool to learn computers	24	2.38 0.849	2.26 0.885	1.02	0.311
Programmed instruction of clients-staff	25	2.59 0.894	2.60 1.104	-0.06	0.956
Analytic support of education programs	26	2.95 0.713	3.27 0.700	-3.35**	0.001
		N=195	N=83		

Table 9. T-tests of weighted means for attitude Questions 1 and 2 by levels of assignment

	County	Area	t-value	Prob.
Question 1 - Attitudes towards usefulness of computers in Extension work[b]	3.81[a] 0.518[c]	3.81 0.413	0.12	0.904
Question 2 - Attitudes towards potential applications of computers in Extension work[d]	2.72 0.447	2.71 0.543	0.17	0.865
	N=195	N=83		

[a] $\bar{X}$.

[b] Scale = 1-5.

[c] SD.

[d] Scale = 1-4.

significant difference was found, as noted in Table 10. The difference was in Statement 13 ("Have access to other states' programs"). The Scheffé post hoc procedure indicated that the difference was between the group with 3-5 years and the group with more than 20 years of service.

There was very little variation in expressed attitudes among the groups with different lengths of service. Those with fewer years of service, however, showed a tendency to be more positive towards the use of computers. Such a tendency was expected, since those with less service were probably younger and may have been exposed to more pre-service educational opportunities with computers.

The data in Table 12 indicate means, F-values, and F-probabilities for the collapsed attitude statements. No significant differences were found; therefore, Hypothesis 1c (service), which stated that there are no significant differences in the attitudes of Extension personnel toward the use of microcomputers in Extension work when grouped according to length of service, was found tenable. It appears that Extension employees with different lengths of service do not differ significantly in their attitudes towards microcomputers.

Attitudes by education

The results of analysis of variance tests of Hypothesis 1c (education) are in Tables 13, 14, and 15. When examining the statements individually, significant differences were noted in Statements 4 ("Unimproved programs will not benefit me"), 10 ("Want to develop computer materials"), 16 ("Maintain mailing lists"), 17 ("Prepare visual aids"), and 26 ("Analytic

Table 10. Analysis of variance of attitudes for Question 1, items 1-13, by service (scale = 1-5)

Item	No.	0-2	3-5	6-10	11-20	20+	F	F-prob.
Computers will help me in Extension work	1	4.38[a] 0.69[b]	4.35 0.48	4.50 0.82	4.51 0.56	4.39 0.56	0.735	0.569
Computers will depersonalize relations	2	2.00 0.75	2.16 0.57	2.16 1.06	2.06 0.70	2.12 0.67	0.359	0.838
Can learn to use computers in more ways	3	4.70 0.52	4.51 0.51	4.64 0.74	4.55 0.56	4.49 0.50	1.102	0.356
Unimproved programs will not benefit me	4	2.43 0.96	2.72 1.64	2.34 1.34	2.28 0.89	2.31 0.91	1.156	0.335
Easier to get information with computers	5	3.73 0.93	3.67 0.81	3.86 1.01	3.86 0.69	3.83 0.70	0.489	0.744
Will be by-passed if don't use computers	6	2.51 0.77	2.91 1.04	2.88 1.22	3.04 0.90	2.78 0.93	1.825	0.124
Want to learn more about using computers	7	4.46 0.61	4.51 0.51	4.51 1.02	4.39 0.67	4.34 0.60	0.723	0.577
Don't have computer -- difficult to operate	8	2.24 1.86	2.09 1.67	2.38 2.00	1.90 1.39	2.42 1.95	0.924	0.450

[a] $\bar{X}$.

[b] SD.

Table 10. Continued

Item	No.	0-2	3-5	6-10	11-20	20+	F	F-prob.
Computers will cause centralized Extension	9	2.08 0.86	2.42 0.88	2.33 1.16	2.43 0.85	2.46 0.92	1.118	0.348
Want to develop computer materials	10	3.27 1.19	2.86 1.04	2.97 1.23	2.97 0.97	2.66 0.96	1.934	0.105
Computers will aid advantaged clients	11	2.73 1.61	2.95 1.15	2.98 1.25	2.86 1.00	2.78 1.00	0.420	0.794
Computer programs should be developed by teams	12	3.38 0.86	3.56 1.22	3.28 1.09	3.36 0.69	3.12 0.79	1.486	0.207
Have access to other states' programs	13	4.03 0.87	4.30 0.89	4.06 0.87	4.03 0.62	3.81 0.63	2.564*	0.039
		N=37	N=43	N=64	N=69	N=59		

*Significant, $p < .05$.

Table 11. Analysis of variance of attitudes for Question 2, items 14-26, by service (scale = 1-4)

Item	No.	0-2	3-5	6-10	11-20	20+	F	F-prob.
Word processing applications	14	3.43[a] 1.34[b]	3.40 0.85	3.08 0.84	3.06 0.87	3.05 0.90	1.950	.103
Keep financial administrative records	15	2.95 1.43	2.63 1.07	2.64 1.00	2.68 1.25	2.69 0.93	0.529	.715
Maintain mailing lists	16	3.49 0.96	3.60 0.62	3.36 0.95	3.42 0.74	3.58 0.72	0.921	.452
Prepare visual aids	17	2.59 0.93	2.30 0.74	2.38 0.85	2.57 0.92	2.27 0.83	1.575	.181
Plan programs and schedule time	18	1.73 0.87	1.60 0.62	1.80 1.14	1.88 0.83	1.66 0.76	0.897	.466
Provide rapid access to information	19	3.19 0.81	3.00 0.65	3.02 0.83	3.03 0.75	3.05 0.71	0.410	.802
Send receive mail within Extension	20	2.86 1.53	2.47 0.77	2.56 0.81	2.72 1.19	2.80 0.85	1.176	.322
Send receive mail outside Extension	21	2.08 1.40	1.84 0.79	1.94 1.14	2.10 1.17	1.88 0.79	0.639	.635

[a] $\bar{X}$.

[b] SD.

Table 11. Continued

Item	No.	0-2	3-5	6-10	11-20	20+	F	F-prob.
Show problem solutions at meetings	22	3.08 1.36	2.56 0.83	2.81 0.79	2.77 0.79	2.71 0.74	1.853	.119
Run decision aid programs for individuals	23	3.14 0.86	2.88 0.91	3.30 0.87	3.22 0.78	3.20 0.76	1.754	.138
As clients' tool to learn computers	24	2.68 0.97	2.19 0.82	2.23 0.81	2.36 0.82	2.39 0.89	2.055	.087
Programmed instruction of clients-staff	25	2.95 1.33	2.42 0.82	2.65 0.78	2.58 1.09	2.46 0.75	1.985	.097
Analytic support of education programs	26	3.14 0.75	2.93 0.80	2.95 0.74	3.17 0.71	3.05 0.63	1.224	.301
		N=37	N=43	N=64	N=69	N=59		

Table 12. Analysis of variance of weighted means for Questions 1 and 2 by service

	0-2	3-5	6-10	11-20	20+	F	F-prob.
Question 1 - Attitudes towards usefulness of computers in Extension work[c]	3.84[a] .46[b]	3.80 .36	3.86 .72	3.81 .37	3.70 .39	.911	.458
Question 2 - Attitudes towards potential applications of computers in Extension work[d]	2.87 .61	2.60 .41	2.67 .41	2.74 .50	2.68 .43	1.865	.117
	N=37	N=43	N=64	N=69	N=59		

[a] $\bar{X}$.

[b] SD.

[c] Scale = 1-5.

[d] Scale = 1-4.

Table 13. Analysis of variance of attitudes for Question 1, items 1-13, by education (scale = 1-5)

Item	No.	Bachelor's	Work on master's	Master's or above	F	F-prob.
Computers will help me in Extension work	1	4.35[a] 0.54[b]	4.57 0.82	4.44 0.60	1.750	0.176
Computers will depersonalize relations	2	2.18 0.64	2.16 1.14	2.05 0.69	0.955	0.386
Can learn to use computers in more ways	3	4.51 0.50	4.71 0.82	4.56 0.52	1.935	0.146
Unimproved programs will not benefit me	4	2.38 0.80	2.82 1.88	2.25 0.96	4.630*	0.011
Easier to get information with computers	5	3.75 0.67	3.90 1.12	3.80 0.78	0.493	0.611
Will be by-passed if don't use computers	6	2.97 0.88	2.80 1.24	2.83 0.97	0.634	0.531
Want to learn more about using computers	7	4.31 0.55	4.63 0.83	4.44 0.75	2.920	0.056
Don't have computer -- difficult to operate	8	2.48 2.07	2.22 1.84	2.10 1.69	1.038	0.356

[a] $\bar{X}$.

[b] SD.

*Significant, $p < .05$.

Table 13. Continued

Item	No.	Bachelor's	Work on master's	Master's or above	F	F-prob.
Computers will cause centralized Extension	9	2.39 0.87	2.39 1.26	2.34 0.87	0.119	0.888
Want to develop computer materials	10	2.56 0.87	3.14 1.35	3.03 1.04	5.904**	0.003
Computers will aid advantaged clients	11	2.87 0.97	3.02 1.61	2.85 1.20	0.354	0.702
Computer programs should be developed by teams	12	3.34 0.70	3.45 1.14	3.28 0.96	0.635	0.531
Have access to other states' programs	13	3.89 0.55	4.14 1.00	4.10 0.87	1.945	0.145
		N=71	N=49	N=155		

**Highly significant, $p < .01$.

Table 14. Analysis of variance of attitudes for Question 2, items 14-26, by education (scale = 1-4)

Item	No.	Bachelor's	Work on master's	Master's or above	F	F-prob.
Word processing applications	14	3.06[a] 0.89[b]	3.39 0.86	3.15 0.99	1.828	.163
Keep financial administrative records	15	2.55 0.89	3.00 0.98	2.68 1.25	2.414	.091
Maintain mailing lists	16	3.52 0.63	3.71 0.61	3.39 0.91	3.270*	.040
Prepare visual aids	17	2.20 0.71	2.35 0.78	2.55 0.93	4.562*	.011
Plan programs and schedule time	18	1.86 1.11	1.59 0.64	1.79 1.00	1.152	.318
Provide rapid access to information	19	2.97 0.65	3.22 0.71	3.03 0.79	1.775	.172
Send receive mail within Extension	20	2.54 0.88	2.88 0.75	2.69 1.17	1.590	.206
Send receive mail outside Extension	21	1.96 0.71	1.92 0.76	1.99 1.27	.081	.922

[a] $\bar{X}$.

[b] SD.

*Significant, $p < .05$.

Table 14. Continued

Item	No.	Bachelor's	Work on master's	Master's or above	F	F-prob.
Show problem solutions at meetings	22	2.68 0.81	3.00 1.15	2.80 0.96	1.642	.196
Run decision aid programs for individuals	23	3.17 0.83	3.27 0.70	3.14 0.87	.409	.665
As clients' tool to learn computers	24	2.46 0.88	2.37 0.78	2.29 0.88	1.016	.363
Programmed instruction of clients-staff	25	2.58 0.84	2.82 1.17	2.54 0.93	1.621	.200
Analytic support of education programs	26	2.87 0.72	3.04 0.64	3.13 0.74	3.115*	.046
		N=71	N=49	N=155		

Table 15. Analysis of variance of weighted means for Questions 1 and 2 by education

	Bachelor's	Work on master's	Master's or above	F	F-prob.
Question 1 - Attitudes towards usefulness of computers in Extension work[c]	3.72[a] .34[b]	3.94 .89	3.81 .39	2.846	.060
Question 2 - Attitudes towards potential applications of computers in Extension work[d]	2.65 .45	2.81 .40	2.71 .51	1.765	.173
	N=71	N=49	N=155		

[a] $\bar{X}$.

[b] SD.

[c] Scale = 1-5.

[d] Scale = 1-4.

support of educational programs"). The differences, located by the Scheffé procedure, were between those working on a master's degree and those with a master's or above (Statement 4), those with a bachelor's and those working on a master's and those with a bachelor's and those with a master's or above (Statement 10), and those with a bachelor's and those working on a master's (Statements 16, 17, and 26). There were no discernible patterns indicating a high or low attitude of any one group.

No significant differences were found among the groups when weighted means were computed (see Table 15). Hypothesis 1c (education), which stated that there were no significant differences in the attitudes of Extension personnel toward the use of microcomputers in Extension work when grouped according to educational level, was not rejected. It was concluded that those with different educational achievements did not differ significantly in their attitudes towards microcomputers.

Attitudes by age

The next independent variable analyzed in relation to attitudes was the age of the respondents. There were four age groups analyzed. Again, some differences were noted on an item-by-item basis (Tables 16 and 17), but not after combining the statements. Differences were in Statements 7 ("Want to learn more about using computers"), 10 ("Want to develop computer materials"), and 19 ("Provide rapid access to information"). The differences, located by the Scheffé procedure, were between the 41-50 and 51+ age groups in Statements 7 and 10 and between the 31-40 and 41-50 age groups in Statement 19.

Upon close examination of the means in Table 16, it was noted that the means of the 18-30 age group and the 51+ group were very similar on several attitude statements. In most cases, this mean was below the mean of the other two groups. Although not statistically verified, it appears that the attitude of the respondents towards microcomputers gradually became more positive until the age of 50 and then began to decrease. If this indication is accurate, it may be important to consider when future in-service education is planned in the microcomputer area.

The collapsed mean scores are in Table 18. No significant differences were discovered, so Hypothesis 1c (age), which stated that there are no significant differences in the attitudes of Extension personnel toward the use of microcomputers in Extension work when grouped according to age, was not rejected. It can be concluded that different Extension age groups do not differ significantly in their attitudes toward microcomputers.

Attitudes by sex

In analyzing attitudes by sex, t-tests were utilized. On an item-by-item analysis, significant differences between the two groups were found in their attitudes towards learning to use computers in more ways (Statement 3, which indicated a more positive attitude for females), the benefit of unimproved programs (Statement 4, which indicated a more positive attitude by males), and having access to other states' programs (Statement 13, indicating that females had a more positive attitude). In general, females had a slightly higher (more positive) mean than males in Question 1 (Table 19), in attitudes toward learning more

Table 16. Analysis of variance of attitudes for Question 1, items 1-13, by age (scale = 1-5)

Item	No.	18-30	31-40	41-50	51+	F	F-prob.
Computers will help me in Extension work	1	4.35[a] 0.60[b]	4.43 0.57	4.59 0.76	4.41 0.55	1.652	.178
Computers will depersonalize relations	2	2.02 0.58	2.07 0.66	2.19 1.07	2.01 0.62	.748	.524
Can learn to use computers in more ways	3	4.61 0.54	4.60 0.49	4.63 0.75	4.52 0.50	.486	.693
Unimproved programs will not benefit me	4	2.67 1.59	2.46 1.06	2.19 1.14	2.25 0.95	1.980	.117
Easier to get information with computers	5	3.74 0.88	3.81 0.74	3.96 1.00	3.73 0.70	1.025	.382
Will be by-passed if don't use computers	6	2.67 0.92	2.82 0.96	2.99 1.17	2.93 0.93	1.036	.377
Want to learn more about using computers	7	4.46 0.50	4.43 0.67	4.65 0.91	4.30 0.64	2.895*	.036
Don't have computer -- difficult to operate	8	2.28 1.92	2.14 1.68	2.16 1.83	2.38 2.00	.258	.855

[a] $\bar{X}$.

[b] SD.

*Significant, $p < .05$.

Table 16. Continued

Item	No.	18-30	31-40	41-50	51+	F	F-prob.
Computers will cause centralized Extension	9	2.04 0.79	2.30 0.85	2.50 1.18	2.41 0.84	2.392	.069
Want to develop computer materials	10	2.80 1.19	2.99 1.05	3.28 1.13	2.68 0.92	4.056**	.008
Computers will aid advantaged clients	11	2.87 1.41	2.96 1.28	2.79 1.28	2.83 1.00	.269	.848
Computer programs should be developed by teams	12	3.28 0.89	3.41 1.02	3.34 1.03	3.23 0.78	.520	.669
Have access to other states' programs	13	4.07 0.61	4.23 1.00	4.06 0.86	3.90 0.61	2.067	.105
		N=46	N=83	N=68	N=71		

**Highly significant, $p < .01$.

Table 17. Analysis of variance of attitudes for Question 2, items 14-26, by age (scale = 1-4)

Item	No.	18-30	31-40	41-50	51+	F	F-prob.
Word processing applications	14	3.43[a] 0.81[b]	3.18 0.89	3.09 1.18	3.08 0.86	1.550	.202
Keep financial administrative records	15	2.74 0.93	2.64 1.08	2.69 1.19	2.80 1.27	.282	.838
Maintain mailing lists	16	3.61 0.74	3.37 0.96	3.41 0.80	3.58 0.65	1.376	.250
Prepare visual aids	17	2.39 0.71	2.53 0.95	2.43 0.90	2.35 0.83	.584	.626
Plan programs and schedule time	18	1.59 0.58	1.96 1.41	1.74 0.73	1.70 0.76	1.748	.158
Provide rapid access to information	19	3.09 0.78	3.19 0.69	2.85 0.78	3.10 0.72	2.770*	.042
Send receive mail within Extension	20	2.72 0.93	2.63 0.91	2.69 1.14	2.76 1.19	.216	.885
Send receive mail outside Extension	21	1.93 0.74	1.96 1.10	2.01 1.17	1.96 1.15	.059	.981

[a] $\bar{X}$.

[b] SD.

*Significant, $p < .05$.

Table 17. Continued

Item	No.	18-30	31-40	41-50	51+	F	F-prob.
Show problem solutions at meetings	22	2.93 1.25	2.84 1.05	2.79 0.78	2.70 0.80	.576	.632
Run decision aid programs for individuals	23	3.09 0.81	3.19 0.93	3.12 0.86	3.28 0.70	.674	.568
As clients' tool to learn computers	24	2.43 0.86	2.24 0.88	2.40 0.85	2.34 0.88	.642	.589
Programmed instruction of clients-staff	25	2.80 1.24	2.51 0.86	2.57 0.72	2.58 1.09	.967	.409
Analytic support of education programs	26	2.85 0.73	3.13 0.73	3.07 0.70	3.10 0.72	1.694	.169
		N=46	N=83	N=68	N=71		

Table 18. Analysis of variance of weighted means for Questions 1 and 2 by age

	18-30	31-40	41-50	51+	F	F-prob.
Question 1 - Attitudes towards usefulness of computers in Extension work[c]	3.82[a] .41[b]	3.81 .35	3.93 .70	3.74 .41	1.745	.158
Question 2 - Attitudes towards potential applications of computers in Extension work[d]	2.74 .47	2.72 .47	2.68 .49	2.72 .49	.152	.928
	N=46	N=83	N=68	N=71		

[a] $\bar{X}$.

[b] SD.

[c] Scale = 1-5.

[d] Scale = 1-4.

about computers. The males indicated that they did not need to learn as much about computers as did the females.

Results in Table 20 indicated that females had a more positive attitude towards the various possible uses of computers in Cooperative Extension work. However, none of the differences was significant.

The weighted means are shown in Table 21. They are extremely close, indicating no significant differences. Hypothesis 1c (sex), which stated that there were no significant differences in the attitudes of Extension personnel towards the use of microcomputers in Extension work when grouped according to sex, was not rejected. Therefore, it was concluded that males and females do not differ significantly in their attitudes towards microcomputers.

Analysis within items

Even though this study focused primarily on differences between groups, a brief analysis within groups, by items, was undertaken to look for significant trends or other information. The means of items 1-13 were first examined. The sample was grouped several different ways for analysis, including area of responsibility (Agriculturists, Home Economists, and 4-H Youth Leaders), level of responsibility (area and county), years of Extension service (0-2, 3-5, 6-10, 11-20, and 20+), education (bachelor's degree, working on master's degree, and master's degree or above), age (18-30, 31-40, 41-50, and 51+), and sex (male and female). All 19 of the groups felt most positive towards "Can learn to use computers in more ways," "Want to learn more about using computers," and "Computers will help in Extension work." All but one

Table 19. T-tests of attitudes for Question 1, items 1-13, by sex (scale = 1-5)

Item	No.	Male	Female	t-value	Prob.
Computers will help me in Extension work	1	4.50[a] 0.570[b]	4.36 0.704	1.75	0.082
Computers will depersonalize relations	2	2.08 0.657	2.11 0.925	-0.27	0.791
Can learn to use computers in more ways	3	4.51 0.525	4.67 0.656	-2.17*	0.031
Unimproved programs will not benefit me	4	2.24 0.949	2.61 1.413	-2.39*	0.018
Easier to get information with computers	5	3.81 0.764	3.81 0.913	-0.07	0.947
Will be by-passed if don't use computers	6	2.86 0.968	2.85 1.053	0.08	0.935
Want to learn more about using computers	7	4.41 0.698	4.49 0.769	-0.82	0.414
Don't have computer -- difficult to operate	8	2.13 1.629	2.31 1.997	-0.76	0.449

[a] $\bar{X}$.

[b] SD.

*Significant, $p < .05$.

Table 19. Continued

Item	No.	Male	Female	t-value	Prob.
Computers will cause centralized Extension	9	2.39 0.894	2.31 1.032	0.67	0.501
Want to develop computer materials	10	3.03 0.990	2.78 1.208	1.82	0.070
Computers will aid advantaged clients	11	2.84 1.131	2.95 1.383	-0.69	0.490
Computer programs should be developed by teams	12	3.28 0.947	3.39 0.929	-0.97	0.331
Have access to other states' programs	13	3.98 0.804	4.18 0.856	-1.97*	0.050
		N=165	N=107		

Table 20. T-tests of attitudes for Question 2, items 14-26, by sex (scale = 1-4)

Item	No.	Male	Female	t-value	Prob.
Word processing applications	14	3.11[a] 0.994[b]	3.29 0.869	-1.54	0.125
Keep financial administrative records	15	2.67 1.094	2.76 1.188	-0.60	0.549
Maintain mailing lists	16	3.44 0.807	3.54 0.804	-1.00	0.320
Prepare visual aids	17	2.38 0.844	2.51 0.894	-1.29	0.198
Plan programs and schedule time	18	1.73 0.734	1.83 1.277	-0.72	0.470
Provide rapid access to information	19	3.01 0.765	3.13 0.715	-1.28	0.201
Send receive mail within Extension	20	2.61 1.004	2.79 1.088	-1.42	0.158
Send receive mail outside Extension	21	1.90 0.945	2.05 1.235	-1.09	0.277

[a] $\bar{X}$.

[b] SD.

Table 20. Continued

Item	No.	Male	Female	t-value	Prob.
Show problem solutions at meetings	22	2.82 0.958	2.79 0.991	0.27	0.784
Run decision aid programs for individuals	23	3.18 0.811	3.18 0.867	-0.02	0.986
As clients' tool to learn computers	24	2.42 0.871	2.23 0.842	1.79	0.075
Programmed instruction of clients-staff	25	2.56 0.939	2.65 1.001	-0.81	0.420
Analytic support of education programs	26	3.09 0.706	3.00 0.740	1.02	0.309
		N=165	N=107		

Table 21. T-tests of weighted means for attitude Questions 1 and 2 by sex

	Male	Female	t-value	Prob.
Question 1 - Attitudes towards usefulness of computers in Extension work[b]	3.79[a] 0.376[c]	3.84 0.627	-0.74	0.459
Question 2 - Attitudes towards potential applications of computers in Extension work[d]	2.69 0.475	2.75 0.479	-1.09	0.277
	N=195	N=83		

[a] $\bar{X}$.

[b] Scale = 1-5.

[c] SD.

[d] Scale = 1-4.

of the groups (age 41-50) had the highest mean for "Can learn to use computers in more ways," indicating that Extension personnel felt that microcomputers may have a legitimate place in Extension's future and are willing to learn more ways to use them.

Several statements (2, 4, 6, 8, 9, and 11) in items 1-13 were originally written in a negative, or reverse, format. The means of those statements could not, therefore, be compared with the other means. Responses to these questions resulted in a low mean, which could be interpreted as a higher mean because of the wording of the statement. No discernible pattern was noticeable among these or other lower means.

Items 14-26 were directed more towards applications of microcomputers for specific tasks. The most positive feeling was exhibited towards "Maintain mailing lists," by all but one (area group) of the 19 groups. "Word processing applications," and "Run decision aid programs for individuals" were rated second and third, but in no particular order. Another item, "Provide rapid access to information," was in the top three choices of some groups, including the group with 3-5 years of Extension service, the 31-40 age group, and the female group. The majority of the respondents felt most positive towards using microcomputers for maintaining mailing lists, word processing, and analyses for clientele.

The lowest mean of items 14-26 was in response to the "Plan programs and schedule time" statement. Every group placed it last. The next lowest was "Send mail outside Extension." Most of the items with low means seemed to be tasks that are not traditionally performed by

machines, especially computers. These ratings may change as computers assume more of the workload in areas historically handled by Extension professionals and office assistants.

Perceived training needs by program areas of responsibility

The data collected concerning perceived training needs were categorical data. The chi-square test was used to test for significance. Even though means could not be computed, the raw data shed some light on perceptions of microcomputer training needed and the form it should take.

The data in Table 22 describe the perceptions of the type of microcomputer training needed by county personnel by program area of responsibility. All three groups preferred "Use of specific programs" as first choice, followed by "Basics of computer operation." Home Economists and 4-H Leaders selected "Writing specific programs" as third choice, with "Other training" last. The Agriculturists group reversed the last two.

Results of a chi-square analysis revealed that perceptions of the type of microcomputer training needed were independent of areas of responsibility. "Use of specific programs" was the overwhelming first choice of all three groups.

Data pertaining to the perceptions of the form of microcomputer training needed are presented in Table 23. Agreement was complete in ranking the four choices. All groups placed "In-service education" first, "Credit classes held off-campus" second, "Self-study materials" third, and "Credit classes held on-campus" last.

Table 22. Perceptions of the type of microcomputer training needed by Iowa Cooperative Extension personnel by areas of responsibility

Types of training	Agri-culturist		Home Economist		4-H Leader		X^2	Significance	Cramer's V
	No.	% of N	No.	% of N	No.	% of N			
Basics of computer operation	41[a]	44.6	21	38.9	17	41.5	0.46	0.794	.05
	51[b]	55.4	33	61.1	24	58.5			
Use of specific programs	71	77.2	33	61.1	31	75.6	4.68	0.096	.16
	21	22.8	21	38.9	10	24.4			
Writing specific programs	16	17.4	6	11.1	4	9.8	1.88	0.391	.10
	76	82.6	48	88.9	37	90.2			
Other training	6	6.5	7	13.0	6	14.6	2.70	0.260	.12
	86	93.5	47	87.0	35	85.4			
	N=92		N=54		N=41				

[a]Yes.

[b]No.

Table 23. Perceptions of the form of microcomputer training needed by Iowa Cooperative Extension personnel by areas of responsibility

Types of training	Agri-culturist No.	Agri-culturist % of N	Home Economist No.	Home Economist % of N	4-H Leader No.	4-H Leader % of N	X^2	Significance	Cramer's V
Credit classes held off-campus	25[a]	27.2	13	24.1	15	36.6	0.93	0.920	.07
	10[b]	10.9	5	9.3	4	9.8			
Credit classes held on-campus	6	6.5	0	0.0	0	0.0	4.13	0.389	.28
	9	9.8	1	1.9	3	7.3			
In-service education	54	58.7	31	57.4	21	51.2	6.64	0.156	.15
	12	13.0	5	9.3	10	24.4			
Self-study materials	13	14.1	7	13.0	6	14.6	1.08	0.898	.88
	13	14.1	11	20.4	7	17.1			
	N=92		N=54		N=41				

[a]First choice.

[b]Second choice.

A chi-square analysis revealed an independent relationship between program areas of responsibility and the perceptions of the forms of microcomputer training needed. "In-service education" was selected as first choice by a majority of the respondents.

Hypothesis 2a, which stated that there are no significant differences in the perceived training needs of Extension personnel in computer technology when grouped according to program areas of responsibility, was found tenable. It appears that the perceptions of county personnel in relation to training needs of Extension in microcomputers are independent of program area of responsibility.

Perceived training needs by level of assignment

Table 24 describes the perceptions of the type of microcomputer training needed by area and county personnel. The first choice of area personnel was the "Use of specific programs," followed by "Writing specific programs," "Basics of computer operation," and "Other training." County personnel rated the types of training needed, in descending order, as follows: "Use of specific programs," "Basics of computer operation," "Writing specific programs," and "Other training."

A chi-square analysis revealed a dependent relationship between respondents' position and their perceptions of types of microcomputer training needed. Those differences were in "Use of specific programs," "Basics of computer operation," and "Writing specific programs."

The data in Table 25 describe the perceptions of the form of microcomputer training needed by area and county personnel. Both county and area personnel indicated in-service education as the

Table 24. Perceptions of the type of microcomputer training needed by Iowa Cooperative Extension personnel by level of assignment

Types of training	Area		County		X^2	Significance	Phi
	No.	% of N	No.	% of N			
Basics of computer operation	15[a]	19.2	83	42.6	13.18**	0.000	.22
	63[b]	80.8	112	57.4			
Use of specific programs	45	57.7	142	72.8	5.91*	0.015	.15
	33	42.3	53	27.2			
Writing specific programs	21	26.9	27	13.9	6.57*	0.010	.16
	57	73.1	168	86.1			
Other training	14	17.9	19	9.7	3.53	0.060	.11
	64	82.1	176	90.3			
	N=78		N=195				

[a]Yes.

[b]No.

*Significant, $p < .05$.

**Highly significant, $p < .01$.

Table 25. Perceptions of the form of microcomputer training needed by Iowa Cooperative Extension personnel by level of assignment

Types of training	Area		County		X^2	Significance	Cramer's V
	No.	% of N	No.	% of N			
Credit classes held off-campus	9[a]	11.5	54	27.7	3.02	0.220	.16
	6[b]	7.7	20	10.3			
Credit classes held on-campus	1	1.3	6	3.1	0.92	0.633	.16
	3	3.8	13	6.7			
In-service education	48	61.5	112	57.4	3.52	0.172	.13
	5	6.4	28	14.4			
Self-study materials	10	12.8	27	13.8	0.51	0.776	.07
	17	21.8	34	17.4			
	N=78		N=195				

[a]First choice.

[b]Second choice.

preferred form of microcomputer training. Area personnel indicated a preference for self-study materials next, followed by credit classes held off-campus and credit classes held on-campus. County personnel chose credit classes held off-campus as second choice, followed by self-study materials and credit classes held on-campus.

A chi-square analysis revealed no dependent relationships between respondents' position and their perceptions of forms of microcomputer training needed. Inspection of the data in Table 25 did reveal a clear first choice (in-service education) and last choice (credit classes held on-campus) of both groups.

Hypothesis 2b stated that there are no significant differences in the perceived training needs of Extension personnel in computer technology when grouped according to level of assignment (county or area). Since chi-square analysis did reveal significant differences, Hypothesis 2b was rejected. It was concluded that perceived training needs of Extension personnel in computer technology is independent of level of assignment.

Perceived training needs by service

Data concerning the perceived types of training needed by Extension by length of service are shown in Table 26. All five groups selected "Use of specific programs" as first choice. The 0-2 years group selected "Writing specific programs" as second choice, while the other four groups indicated a preference for "Basics of computer operation" as second choice. No clear pattern emerged in ranking the third and fourth choices.

Table 26. Perceptions of the type of microcomputer training needed by Cooperative Extension personnel by length of service

Types of training	0-2 yrs. No.	0-2 yrs. % N	3-5 yrs. No.	3-5 yrs. % N	6-10 yrs. No.	6-10 yrs. % N	11-20 yrs. No.	11-20 yrs. % N	20+ yrs. No.	20+ yrs. % N	X^2	Sig.	Cramer's V
Basics of computer operation	10[a]	27.0	14	32.6	19	30.6	27	40.3	27	46.6	5.59	0.232	.14
	27[b]	73.0	29	67.4	43	69.4	40	59.7	31	53.4			
Use of specific programs	26	70.3	33	76.7	37	59.7	43	64.2	44	75.9	5.69	0.224	.15
	11	29.7	10	23.3	25	40.3	24	35.8	14	24.1			
Writing specific programs	12	32.4	6	14.0	10	16.1	11	16.4	8	13.8	6.74	0.150	.16
	25	67.6	37	86.0	52	83.9	56	83.6	50	86.2			
Other training	3	8.1	6	14.0	10	16.1	7	10.4	5	8.6	2.50	0.645	.10
	34	91.9	37	86.0	52	83.9	60	89.6	53	91.4			
	N=37		N=43		N=62		N=67		N=58				

[a]Yes.

[b]No.

No significant differences in the distribution were revealed among the five groups as a result of a chi-square analysis. "Use of specific programs" was the dominant choice of all groups.

Table 27 contains the data on perceptions of the form of microcomputer training needed by Extension personnel when grouped by length of service. "In-service education" was ranked highest by all groups except the group with 0-2 years of service. That group selected "Credit classes held off-campus" first, "In-service education" second, "Self-study materials" third, and "Credit classes held on-campus" fourth. The other four groups ranked "Credit classes held off-campus" second, "Self-study materials" third, and "Credit classes held on-campus" fourth.

Analysis by a chi-square test for independence revealed significant differences in observed and expected frequencies between length of service groups and their perceptions of credit classes held off-campus and in-service education as a needed form of microcomputer training.

Hypothesis 2c (service), which states that there are no significant differences in the perceived training needs of Extension personnel in computer technology when grouped according to length of Extension service, was rejected. It can be concluded that the perception of training needs in computer technology is dependent upon length of service.

Perceived training needs by education

Data concerning the perceptions of the type of microcomputer training needed, when grouped by educational level, are presented

Table 27. Perceptions of the form of microcomputer training needed by Cooperative Extension personnel by length of service

Forms of training	0-2 yrs.		3-5 yrs.		6-10 yrs.		11-20 yrs.		20+ yrs.		X^2	Sig.	Cramer's V
	No.	% N	No.	% N	No.	% N	No.	% N	No.	% N			
Credit classes held off-campus	16[a]	43.2	11	25.6	19	30.6	8	11.9	7	12.1	15.61*	0.048	.26
	3[b]	8.1	3	7.0	4	6.5	12	17.9	4	6.9			
Credit classes held on-campus	0	0.0	3	7.0	0	0.0	2	3.0	2	3.4	15.19	0.056	.47
	3	8.1	2	4.7	7	11.3	3	4.5	0	0.0			
In-service education	11	29.7	22	51.2	36	58.1	47	70.1	41	70.7	19.97*	0.010	.22
	8	21.6	7	16.3	10	16.1	4	6.0	3	5.2			
Self-study materials	10	27.0	5	11.6	7	11.3	7	10.4	7	12.1	15.33	0.053	.26
	2	5.4	8	18.6	15	24.2	10	14.9	15	25.9			
	N=37		N=43		N=62		N=67		N=58				

[a]First choice.

[b]Second choice.

*Significant, $p < .05$.

in Table 28. All three groups agreed on their ranking of the first two types. First choice was "Use of specific programs," followed by "Basics of computer operation." The group with a bachelors degree selected "Other training" third, with "Writing specific programs" last, while the other two groups reversed the third and fourth choices.

The results of the chi-square analysis showed a significant relationship in the "Basics of computer operation" choice. All three groups selected it as second choice.

Table 29 contains the data for perceptions of the form of micro-computer training needed by Extension personnel, when grouped by educational level. There was a difference in the perceptions of "In-service education" and "Credit classes held off-campus." Those with a bachelor's degree and those with a master's or above selected in-service as first choice, with off-campus credit classes second, self-study third, and on-campus classes last. Those working on a master's degree reversed the first two selections.

The chi-square analysis revealed a significant relationship in the perception of "In-service education." This form of training was selected second by those working on a master's degree and first by the other two groups.

Hypothesis 2c (education), which stated that there were no significant differences in the perceived training needs of Extension personnel in computer technology when grouped according to education,

Table 28. Perceptions of the type of microcomputer training needed by Cooperative Extension personnel by educational level

Types of training	Bachelor's		Working on master's		Master's or above		X^2	Sig.	Cramer's V
	No.	% of N	No.	% of N	No.	% of N			
Basics of computer operation	36[a]	50.7	15	30.6	46	30.7	9.14*	0.010	.18
	35[b]	49.3	34	69.4	104	69.3			
Use of specific programs	49	69.0	37	75.5	99	66.0	1.56	0.459	.08
	22	31.0	12	24.5	51	34.0			
Writing specific programs	6	8.5	9	18.4	32	21.3	5.60	0.061	.14
	65	91.5	40	81.6	118	78.7			
Other training	10	14.1	8	16.3	14	9.3	2.19	0.335	.09
	61	85.9	41	83.7	136	90.7			
	N=71		N=49		N=150				

[a]Yes.

[b]No.

*Significant, $p < .05$.

Table 29. Perceptions of the form of microcomputer training needed by Cooperative Extension personnel by educational level

Types of training	Bachelor's		Working on master's		Master's or above		X^2	Sig.	Cramer's V
	No.	% of N	No.	% of N	No.	% of N			
Credit classes held off-campus	19[a]	26.8	22	44.9	22	14.7	5.90	0.207	.16
	9[b]	12.7	4	8.2	13	8.7			
Credit classes held on-campus	0	0.0	2	4.1	5	3.3	3.98	0.409	.24
	5	7.0	5	10.2	6	4.0			
In-service education	41	57.7	16	32.7	101	67.3	22.12**	0.000	.23
	6	8.5	14	28.6	13	8.7			
Self-study materials	7	9.9	7	14.3	23	15.3	2.66	0.616	.11
	14	19.7	6	12.2	30	20.0			
	N=71		N=49		N=150				

[a]First choice.

[b]Second choice.

**Highly significant, $p < .01$.

was rejected. It appears that the perception of microcomputer training by Extension personnel is dependent upon education.

Perceived training needs by age

Table 30 presents the data pertaining to perceptions of the type of microcomputer training needed by Extension personnel when grouped by age. The first choice of all four groups was "Use of specific programs." Three groups (31-40, 41-50, and 51+) selected "Basics of computer operation" as second choice. The 18-30 age group had the same number select "Basics of computer operation" and "Writing specific programs," and selected "Other training" last. The 31-40 and 41-50 groups selected "Writing specific programs" third and "Other training" fourth, while the 51+ group reversed these two.

Chi-square analysis revealed a significant relationship in selection of "Basics of computer operation." A greater proportion of the 51+ group selected it.

Table 31 presents the data dealing with perceptions of the form of microcomputer training needed by Extension personnel when grouped by age. The clear choice of groups 31-40, 41-50, and 51+ was "In-service education," but the 18-30 group selected "Credit classes held off-campus," which was the second choice of the 31-40 and 41-50 groups. The second choice of the 51+ group was "Self-study materials."

Chi-square analysis revealed a significant relationship among the groups in selection of "In-service education." This was the first choice of three of the groups.

Table 30. Perceptions of the type of microcomputer training needed by Cooperative Extension personnel by age

Types of training	18-30		31-40		41-50		51+		X^2	Sig.	Cramer's V
	No.	% of N	No.	% of N	No.	% of N	No.	% of N			
Basics of computer operation	9[a]	19.6	29	35.8	23	33.8	33	48.5	10.19*	0.017	.20
	37[b]	80.4	52	64.2	45	66.2	35	51.5			
Use of specific programs	32	69.6	55	67.9	50	73.5	44	64.7	1.28	0.733	.07
	14	30.4	26	32.1	18	26.5	24	35.3			
Writing specific programs	9	19.6	19	23.5	12	17.6	7	10.3	4.47	0.215	.13
	37	80.4	62	76.5	56	82.4	61	89.7			
Other training	5	10.9	8	9.9	11	16.2	8	11.8	1.50	0.682	.08
	41	89.1	73	90.1	57	33.8	60	88.2			
	N=46		N=81		N=68		N=68				

[a]Yes.

[b]No.

*Significant, $p < .05$.

Table 31. Perceptions of the form of microcomputer training needed by Cooperative Extension personnel by age

Types of training	18-30		31-40		41-50		51+		X^2	Sig.	Cramer's V
	No.	% of N	No.	% of N	No.	% of N	No.	% of N			
Credit classes held off-campus	20[a]	43.5	22	27.2	12	17.6	8	11.8	7.65	0.265	.18
	5[b]	10.9	8	9.9	7	10.3	6	8.8			
Credit classes held on-campus	1	2.2	2	2.5	2	2.9	2	2.9	3.71	0.715	.23
	5	10.9	5	6.2	3	4.4	2	2.9			
In-service education	18	39.1	44	54.3	49	72.1	44	64.7	16.26*	0.012	.20
	8	17.4	16	19.8	4	5.9	4	5.9			
Self-study materials	9	19.6	12	14.8	7	10.3	9	13.2	9.21	0.162	.20
	4	8.7	17	21.0	16	23.5	12	17.6			
	N=46		N=81		N=68		N=68				

[a]First choice.

[b]Second choice.

*Significant, $p < .05$.

Hypothesis 2c (age), which stated that there are no significant differences in the perceived training needs of Extension personnel in computer technology when grouped according to age, was rejected. It may be concluded that different age groups have different perceptions of microcomputer training for Extension personnel.

Perceived training needs by sex

The data pertaining to perceptions of the type of microcomputer training needed by Extension personnel when grouped by sex are presented in Table 32. There was agreement in the ranking of all four choices by both sexes. The ranking, in descending order, was "Use of specific programs," "Basics of computer operation," "Writing specific programs," and "Other training."

Results of a chi-square analysis showed no significant relationships between the groups. "Using specific programs" was the clear first choice.

Table 33 presents the data dealing with perceptions of the form of microcomputer training needed by Cooperative Extension personnel when grouped by sex. Both groups selected the four choices in the same order. "In-service education" was first, followed by "Credit classes held off-campus," "Self-study materials," and "Credit classes held on-campus."

A chi-square analysis revealed no significant relationships between the two groups. Agreement was complete, with "In-service education" being a clear first choice.

Table 32. Perceptions of the type of microcomputer training needed by Cooperative Extension personnel by sex

Types of training	Male		Female		X^2	Significance	Phi
	No.	% of N	No.	% of N			
Basics of computer operation	60[a]	37.3	37	34.9	0.07	0.793	.02
	101[b]	62.7	69	65.1			
Use of specific programs	111	68.9	72	67.9	0.00	0.967	.01
	50	31.1	34	32.1			
Writing specific programs	33	20.5	14	13.2	1.87	0.172	.09
	128	79.5	92	86.8			
Other training	20	12.4	12	11.3	0.01	0.937	.02
	141	87.6	94	88.7			
	N=161		N=106				

[a]Yes.

[b]No.

Table 33. Perceptions of the form of microcomputer training needed by Cooperative Extension personnel by sex

Types of training	Male		Female		X^2	Significance	Cramer's V
	No.	% of N	No.	% of N			
Credit classes held off-campus	33[a]	20.5	30	28.3	1.26	0.532	.11
	17[b]	10.6	9	8.5			
Credit classes held on-campus	6	3.7	1	0.9	1.28	0.528	.19
	10	6.2	5	4.7			
In-service education	98	60.9	58	54.7	1.74	0.418	.09
	20	12.4	13	12.3			
Self-study materials	23	14.3	13	12.3	1.34	0.511	.11
	27	16.8	23	21.7			
	N=161		N=106				

[a]First choice.

[b]Second choice.

Hypothesis 2c (sex), which stated that there are no significant differences in the perceived training needs of Extension personnel in computer technology when grouped according to sex, was found tenable. It appears that perceived training needs of Extension personnel in computer technology are independent of sex.

Summary of perceived training

Even though data pertaining to perceived training needs were not collected in the most desirable form, the findings were still important. To facilitate comparison of the different groups, Tables 34 and 35 provide, respectively, a brief summary of data collected concerning perceived type of training and form of training needed by Extension personnel.

Multiple Regression Analysis

Even though the primary intent of this descriptive study was to determine "what was" in 1984, it was decided by the research staff that several benefits could be derived from knowing trends of the population in relation to their attitudes towards microcomputer technology. A multiple regression analysis was utilized to determine if the attitudes of the respondents could be predicted if the sex, age, educational level, area of responsibility, level of responsibility, and length of service were known. None of the variables was found to be predictors, either at the .05 or .01 level of significance. It appears that the attitudes of Extension personnel toward microcomputer technology cannot be predicted given the respondents' sex, age,

Table 34. Summary of perceptions of the type of microcomputer training needed by groups

Type	Area of responsibility			Level of responsibility		Years of Extension service				
	Ag.	H. Ec.	4-H	Area	County	0-2	3-5	6-10	11-20	20+
Basics of computer operation	44.6[a]	38.9	41.5	19.2	42.6	27.0	32.6	30.6	40.3	46.6
Use of specific programs	77.2	61.1	75.6	57.7	72.8	70.3	76.7	59.7	64.2	75.9
Writing specific programs	17.4	11.1	9.8	26.9	13.9	32.4	14.0	16.1	16.4	13.8
Other training	6.5	13.0	14.6	17.9	9.7	8.1	14.0	16.1	10.4	8.6

[a]Figures are percentages of N for each question who responded affirmatively.

Table 34. Continued

Type	Education			Age				Sex	
	Bachelor's	Working on master's	Master's or above	18-30	31-40	41-50	51+	Male	Female
Basics of computer operation	50.7	30.6	30.7	19.6	35.8	33.8	48.5	37.3	34.9
Use of specific programs	69.0	75.5	66.0	69.6	67.9	73.5	64.7	68.9	67.9
Writing specific programs	8.5	18.4	21.3	19.6	23.5	17.6	10.3	20.5	13.2
Other training	14.1	16.3	9.3	10.9	9.9	16.2	11.8	12.4	11.3

Table 35. Summary of perceptions of the form of microcomputer training needed by groups

Form	Area of responsibility			Level of responsibility		Years of Extension service				
	Ag.	H. Ec.	4-H	Area	County	0-2	3-5	6-10	11-20	20+
Off-campus credit classes	27.2[a]	24.1	36.6	11.5	27.7	43.2	25.6	30.6	11.9	12.1
On-campus credit classes	6.5	0.0	0.0	1.3	3.1	0.0	7.0	0.0	3.0	3.4
In-service education	58.7	57.4	51.2	61.5	57.4	29.7	58.1	58.1	70.1	70.7
Self-study	14.1	13.0	14.6	12.8	13.8	27.0	11.3	11.3	10.4	12.1

[a]Figures are percentages of N for each question who preferred listed form of training.

Figure 35. Continued

Form	Education			Age				Sex	
	Bachelor's	Working on master's	Master's or above	18-30	31-40	41-50	51+	Male	Female
Off-campus credit classes	26.8	44.9	14.7	43.5	27.2	17.6	11.8	20.5	28.3
On-campus credit classes	0.0	4.1	3.3	2.2	2.5	2.9	2.9	3.7	0.9
In-service education	57.7	32.7	67.3	39.1	54.3	72.1	64.7	60.9	54.7
Self-study	9.9	14.3	15.3	19.6	14.8	10.3	13.2	14.3	12.3

educational level, area of responsibility, level of responsibility, and length of service.

Discussion

The objectives of this study were:

1. To determine selected individual characteristics and computer experiences and training of Extension personnel.
2. To determine the attitudes of Extension personnel towards the uses of microcomputers in their work.
3. To determine current educational and management uses of microcomputers by Extension personnel.
4. To determine future training needs of Extension personnel in microcomputer technology.

During the process of accomplishing these objectives, much information surfaced which could be beneficial to the Iowa Cooperative Extension Service in planning for future expansion in software development, hardware procurement, staffing, and training in the microcomputer area.

Objective one

In determining individual characteristics of Extension personnel, very little was discovered that was unexpected. The distribution by areas of responsibility, length of employment, educational level, age, sex, and levels of responsibility were consistent with results found in a similar study in Mississippi (Cantrell, 1982). But some differences were discovered.

Extension personnel in Iowa indicated that they had considerably more training and computer experience than did respondents to Cantrell's study. She reported that only 23 percent had used a computer, compared with 90 percent in this study. Also, Cantrell reported that 77 percent had not received any training in microcomputers, compared to 97 percent in this study who had received such training.

One possible explanation is the diffusion principle. Emmett (1983) indicated that the use of certain strategies will increase the adoption rate of an innovation. The strategies include providing training and education about the innovation involving management and other personnel in the training choice and process, and being patient with those who are reluctant to use the innovation. The Iowa Cooperative Extension Service has provided for the training and education, involvement of management and others in the training choice and process, and has indicated patience by not attempting to force all local units to purchase and/or use microcomputers (Kruse, 1983; Crom, 1983).

Another possible explanation of greater usage of microcomputers by Iowa Extension is the relative advantage of microcomputers in the accomplishment of many program and office functions. As non-users observe advantages of the innovation, the non-users become adopters (users) (Rogers, 1971).

Objective two

The attitudes of Extension personnel towards microcomputers as an educational tool were very positive. This was indicated by the data in Table 9. The means for county and area personnel were 3.81 and 3.81

for Question 1 (Attitudes towards the usefulness of computers in Extension work) and 2.71 and 2.71 for Question 2 (Attitudes towards potential application of computers in Extension work). The identical means indicated that personnel looked favorably upon the microcomputer as a teaching and management tool, thus providing an area in which the same training program could be provided for a large cross-section of personnel.

Even though homogeneity in attitudes was demonstrated, there was one area where a significant difference existed. The attitude of 4-H Youth Leaders was significantly different from that of the Home Economists ($p=.03$) in relation to their attitude towards the usefulness of computers in Extension work. The Home Economists in Iowa do not work with a formal club organization as do the 4-H Youth Leaders. Working with a dynamic youth membership with a great amount of time pressure may be a major reason why 4-H Youth Leaders have a slightly less positive attitude in this area. They may be apprehensive about the time necessary to learn to effectively utilize a microcomputer in their work.

Objective three

Educational and management use was not very extensive, according to data in Table 2. Approximately 70 percent of the respondents, however, indicated that they had used a computer at least once during the past year to complete some type of analysis for clientele. Approximately 60 percent indicated that they used a microcomputer at least once to prepare for individual instruction, with almost 22 percent

indicating usage between three and nine times. Also, more than 50 percent said they had used a microcomputer at least once during the year in preparing for some type of instruction.

The Iowa Extension administration has been supportive in the microcomputer area by providing a variety of software in various areas to use in assisting clientele. Also, a large segment of the in-service education conducted in 1983 dealt with using the microcomputer as an educational tool (Kruse, 1983). Iowa Extension has taken steps to help meet the challenge issued in the Extension in the 80s report (1983) concerning the acceleration of the development and capacity to utilize computer technology in communication and dissemination of information.

Objective four

Information concerning the type and form of future microcomputer training was collected. There were significant relationships detected using the chi-square test for independence, but the strength of the relationships was very low, again indicating a high degree of homogeneity among the population. The preferred type of microcomputer education desired was in the use of specific programs, with the preferred form being in-service education. Both findings were consistent with present Extension procedures.

There was a minority opinion in relation to the form of training needed. The group with the least amount of Extension service time (0-2 years) selected "Credit classes held off-campus" as their first choice. One possible explanation could be their inexperience in Extension, which could mean they were unfamiliar with in-service

training. Another possible explanation could be that the majority of personnel with 0-2 years of service have a bachelor's degree only but are being encouraged to begin work on advanced degrees. The credit courses taught in their geographical area could be valuable to them.

In general, the results of this study indicated that the Iowa Cooperative Extension Service personnel at the area and county levels were basically homogeneous in their attitudes towards microcomputers. Homogeneity in such a technological area can prove beneficial to the organization, especially in the area of staff development and training. Future sessions in microcomputer training can be planned and used with both county and area personnel, regardless of sex, age, educational level, or length of service. It may be necessary, though, to utilize grouping by areas of responsibility when providing education in the use of specific software programs (the most preferred type of training). Specific programs for use in one area of responsibility may be completely different than software required in another. Also, plans can be made for presenting more microcomputer training through inservice, which was preferred. This would allow Extension to use existing training mechanisms, which may reduce the financial resources necessary to further integrate microcomputer technology into the Iowa Cooperative Extension Service education development program.

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The primary purpose of this study was to ascertain the attitudes of Iowa Cooperative Extension Service personnel towards the use of microcomputers in Extension work. A secondary purpose was to determine the training needs of Extension personnel in microcomputer technology.

The population for this study consisted of all professional employees of the Iowa Cooperative Extension Service at the county and area levels during 1984. Personnel studied were grouped into four categories: Extension Agriculturists, Extension Home Economists, Extension 4-H Youth Leaders, and Area Specialists.

The total population consisted of 317 Cooperative Extension Service professionals. Usable questionnaires were returned by 278, including 92 (33.7 percent) Extension Agriculturists, 54 (19.8 percent) Home Economists, 41 (15.0 percent) 4-H Youth Leaders, 83 (28.6 percent) Area Specialists, and 8 (2.9 percent) undesignated. The overall return rate was 87.7 percent. The data were collected during the period of January 25 through February 29, 1984, by mailed questionnaire. The questionnaire was constructed by researchers in the Department of Journalism and Mass Communication, Iowa State University, and was the second phase of the longitudinal Iowa Agricultural and Home Economics Experiment Station Project 2514. The overall objective of Project 2514 is to determine the impact of computer-based information technologies on the Iowa State University Cooperative Extension Service.

The 32-question instrument was designed to meet the objectives of Project 2514. Because objectives in this study were not congruent to Project 2514 objectives, the data were collected in a form that tended to limit statistical analyses in some cases. The arrangement was considered most advantageous, however, when considering the population studied, available time, and financial considerations.

Data from the research instrument were analyzed using the Statistical Package for Social Sciences (SPSSx, 1983) at the computer facilities of Iowa State University. Statistical procedures included analysis of variance, chi-square, t-tests, and multiple regression. The data were analyzed to determine: (1) selected individual characteristics and computer experiences and training of Extension personnel; (2) attitudes of Extension personnel towards the use of microcomputers in their work; (3) current educational and management use of microcomputers by Extension personnel; and (4) future training needs of Extension personnel in microcomputer technology.

Summary of Findings

This research consisted of a descriptive study of the background characteristics and personnel in relation to microcomputer training and utilization. The findings were divided into four subsections for presentation. The following subsections were used:

1. Demographic characteristics.
2. Past microcomputer use and training.
3. Attitudes toward microcomputer technology.

4. Perceptions of future training needs in microcomputer technology.

Demographic characteristics

1. Thirteen percent of the respondents had been employed by Iowa Cooperative Extension Service 2 years or less. About 15 (15.5) percent had been employed 3 to 5 years, 23.0 percent 6 to 10 years, 24.8 percent 11 to 20 years, and 21.2 percent for more than 20 years.

2. About 26 (25.5) percent of the respondents held a bachelor's degree, with another 17.6 percent holding a bachelor's and also working on a master's degree. More than one-half (51.4 percent) had completed a master's, and 4.3 percent either had completed requirements for a Ph.D. or were working on one.

3. Almost 17 (16.6) percent of the respondents were aged 18 to 30, with 29.9 percent in the 31 to 40 age group, 24.5 percent in the 41 to 50 group, 20.5 percent between 51 and 60, and 5.0 percent over 60 years of age.

4. Almost 60 (59.4) percent of the respondents were male and 38.5 were female.

Past microcomputer use and training

1. Ninety percent (N=249) of the respondents had used a computer during the past year.

2. Almost all (96.4 percent) of the respondents indicated that they had received microcomputer training during the past year.

3. The amount of microcomputer training received varied from one day or less (14.0 percent) to 6 days (15.8 percent). Twenty-six percent had received 2 days of training, 21.2 percent had received 3 days, 12.2 percent had received 4 days, and 7.6 percent had received 5 days.

4. Almost 75 (74.8) percent of those who had received microcomputer training during the past year had received it through the Iowa Cooperative Extension Service. Almost 7 (6.8) percent had received their training through a dealer, 9.2 percent through some college or university, and 9.2 percent from some other source.

5. Respondents indicated that the training they had received was most helpful in making them feel more competent in using computers, with 57.6 percent rating it quite useful or extremely useful. Ranking second was assisting fellow workers in using computers, followed by using computers in new ways to aid clients and using computers in new ways for office management.

6. The most prevalent specific use of the microcomputer was in analyses for clients, with 70.5 percent indicating they had used the microcomputer at least once for this purpose. More than 60 (60.6) percent also indicated they had used the microcomputer for individual instruction. Slightly more than 50 (51.7) percent indicated they had used the microcomputer in preparing for instruction, with approximately 40 percent indicating that they had used it for preparing records. Microcomputers were used very little (4.0 percent) to secure materials or information from other states.

7. Approximately 90 percent of the respondents reported that they had used at least one software program during the past year, while 74.8 percent indicated that they had used three or more.

8. Approximately 65 percent indicated they had used a microcomputer during the past year to assist clients in some way.

Attitudes toward microcomputer technology

1. When county personnel were divided into three groups (Agriculturists, Home Economists, and 4-H Youth Leaders), Home Economists were the most positive in their attitudes towards microcomputer technology ($\bar{X}$=3.36 on a 5-point scale compared to 3.25 for Agriculturists and 3.25 for 4-H Youth Leaders). The difference was not significant.

2. When county personnel were divided into three groups (Agriculturists, Home Economists, and 4-H Youth Leaders), a significant difference was discovered between Home Economists ($\bar{X}$=2.79 on a 4-point scale) and 4-H Youth Leaders ($\bar{X}$=2.56) in their attitudes towards potential applications of computers in Extension work. The mean of the Agriculturists was 2.74.

3. When grouped by county and area positions, county personnel indicated a more positive attitude towards microcomputer technology, both in usefulness of computers in Extension work and in potential application of computers in Extension. The difference was not significant.

4. When divided into five groups by years of service to Extension (0-2 years, 3-5 years, 6-10 years, 11-20 years, and 20+ years), the more positive attitude was indicated by those with 2 years of service

or less in relation to potential applications of computers in Extension work ($\bar{X}$=2.87 on a 4-point scale), while the group with 6 to 10 years of service had the highest mean (3.86 on a 1-5 scale) in relation to usefulness of computers in Extension work. The difference was not significant.

5. The most positive attitude, when grouped by education (bachelor's, working on master's, and master's or above), in relation to usefulness of computers in Extension work and potential applications of computers in Extension work (3.94 on a 1-5 scale and 2.81 on a 1-4 scale, respectively), was exhibited by those working on a master's degree. The least positive attitude in both instances was indicated by those who possessed a bachelor's degree and were not working on their master's (3.72 and 2.65). The differences were not significant.

6. The data showed no clear pattern or trend when respondents were grouped by age. The groups were 18-30, 31-40, 41-50, and 51+. The 41 to 50 age group was most positive ($\bar{X}$=3.93 on a 1-5 scale) in their attitude towards usefulness of computers in Extension work, with those over 50 years of age being least positive (3.74). In attitudes toward potential applications of computers in Extension work, the 18 to 30 age group was most positive (2.74 on a 1-4 scale), while the 41 to 50 age group was least positive (2.68). None of the differences were significant.

7. Females had a more positive attitude in both usefulness of computers in Extension work ($\bar{X}$=3.84 on a 5-point scale) and in potential

applications of computers in Extension work ($\bar{x}$=2.75 on a 4-point scale). The difference was not significant.

8. A regression analysis indicated that attitudes of the respondents could not be predicted using sex, age, educational level, area of responsibility, level of responsibility, or length of service.

Perceptions of future training needs in microcomputer technology

1. The first choice of county personnel in type of microcomputer training needed was "Using specific programs." Second choice was "Basics of computer operations." There were no significant differences when grouped by Agriculturists, Home Economists, and 4-H Youth Leaders.

2. County personnel preferred "In-service education" as the form of microcomputer training needed, with "Credit classes held off-campus" as second choice. There were no significant differences among Agriculturists, Home Economists, and 4-H Youth Leaders.

3. When grouped by county or area, respondents indicated a preference for "Using specific programs," with "Basics of computer operation" placing second, in their perceptions of the type of microcomputer training needed.

4. A highly significant difference (p=.01) was discovered between area and county personnel when the respondents were divided into the two groups. The difference was in their responses to "Basics of computer operation" as the type of microcomputer training needed. A Phi coefficient of .22, however, indicated the relationship was weak.

5. Significant differences were found between area and county personnel in their perceptions of the importance of training in

"Using specific programs" (p=.01) and "Writing specific programs" (p=.01).

6. When grouped into two categories by years of service to Extension, no significant differences were noted in perceptions of the type of microcomputer training needed by Iowa Cooperative Extension personnel. "Using specific programs" was preferred more than any other type.

7. When grouped into five categories by years of service to Extension, a significant difference was found in perceptions of the type of microcomputer training needed. The difference (p=.01) was noted in relation to "In-service education." Those with fewer years of service to Extension showed a stronger preference for credit classes held off-campus, while those with more years of service preferred in-service education.

8. When divided into three groups by education, a significant difference (p=.01) was found in relation to "Basics of computer operation" as a type of microcomputer training needed. The difference was between those with a bachelor's degree and others. The higher preference was indicated by those with a bachelor's degree.

9. When divided into three groups by education, a significant difference (p=.01) was noted between those working on a master's degree and others in relation to "In-service education" as a form of needed microcomputer training. Those working on a master's preferred "Credit classes held off-campus," while the other two groups (those with a

bachelor's and those with a master's or above) preferred "In-service education."

10. When grouped into four categories by age, a significant difference was found in relation to "Basics of computer operation" as a needed type of microcomputer training between the 18 to 30 age group and the other three age groups. The older groups (31-40, 41-50, and 50+) preferred the basics to a greater extent than did the 18 to 30 group.

11. A significant difference ($p=.01$) was discovered between the 18 to 30 age group and the other age groups in relation to "In-service education" as a form of microcomputer training needed. The older age groups preferred "In-service education" to a greater extent than did the 18 to 30 group.

12. No significant differences were noted in relation to the type or form of microcomputer training needed when personnel were grouped according to sex.

Conclusions

The following conclusions were developed based upon the findings of this study.

1. The majority (89.6 percent) of county and area personnel had used a microcomputer and 96.4 percent had received microcomputer training. Seventy-five percent of those receiving training received it through Iowa Cooperative Extension Service. Future microcomputer training should build on previous training, which included introductory hands-on operation and management and educational software usage.

2. Since 70.5 percent of the respondents had used a microcomputer in analyses for clients, more ways should be explored to utilize microcomputers in this way. Resources should be allocated for the development and distribution of software in such areas as home finances, farm management, and estate management.

3. Since 4-H Youth Leaders were less positive in their attitudes towards microcomputers than were the Agriculturists and Home Economists, efforts should be made by administration to emphasize the importance of microcomputer technology to 4-H work, especially in such areas as individualized project work, mail list management, instruction, and preparation of visuals.

4. A major emphasis should be placed on utilizing in-service education for teaching microcomputers, since both groups (county and area) selected in-service education as the preferred form of microcomputer training. This education should be directed at effectively using specific programs, which was also first choice of both groups.

5. Because of the needs of those working on advanced degrees, off-campus credit courses in microcomputer technology should be developed in cooperation with Iowa State University and other colleges and made available at several locations around the state. Those working on a masters degree indicated a preference for off-campus credit courses.

6. Because of the small number of significant differences found in this study, it can be concluded that there was general agreement among Iowa Cooperative Extension Service personnel in their attitudes

towards microcomputers when grouped by sex, age, length of service, education, area of responsibility, and level of responsibility.

Recommendations

This study was designed to ascertain the attitudes of Iowa Cooperative Extension Service personnel toward the use of microcomputers in Extension work and to determine related training needs. Based upon the findings and conclusions drawn, the following recommendations were made for further research in this area.

1. It is recommended that a study be conducted to determine competencies needed by Iowa Cooperative Extension Service personnel in the microcomputer area.

2. This study concentrated on Iowa Cooperative Extension Service personnel. A study was recently conducted by Foster and Miller (1983) which focused on vocational agriculture instructors. It is recommended that a study be conducted to determine relationships in similarities and differences of attitudes, perceptions, and needs of the two groups in the microcomputer area.

3. It is recommended that a study be undertaken to determine the most effective uses of microcomputers in the agricultural education area.

4. The computer area is rapidly changing in relation to hardware, software, knowledge required to operate, costs, and other variables. A study should be conducted to determine both short- and long-term probabilities of microcomputers as an educational and/or management tool.

5. This study should be conducted again within 5 years because of the dynamic nature of microcomputer technology and the changing population of the Iowa Cooperative Extension Service.

6. Results of this study should be made available to Extension administration, especially in the staff development and training area, to facilitate future microcomputer training efforts.

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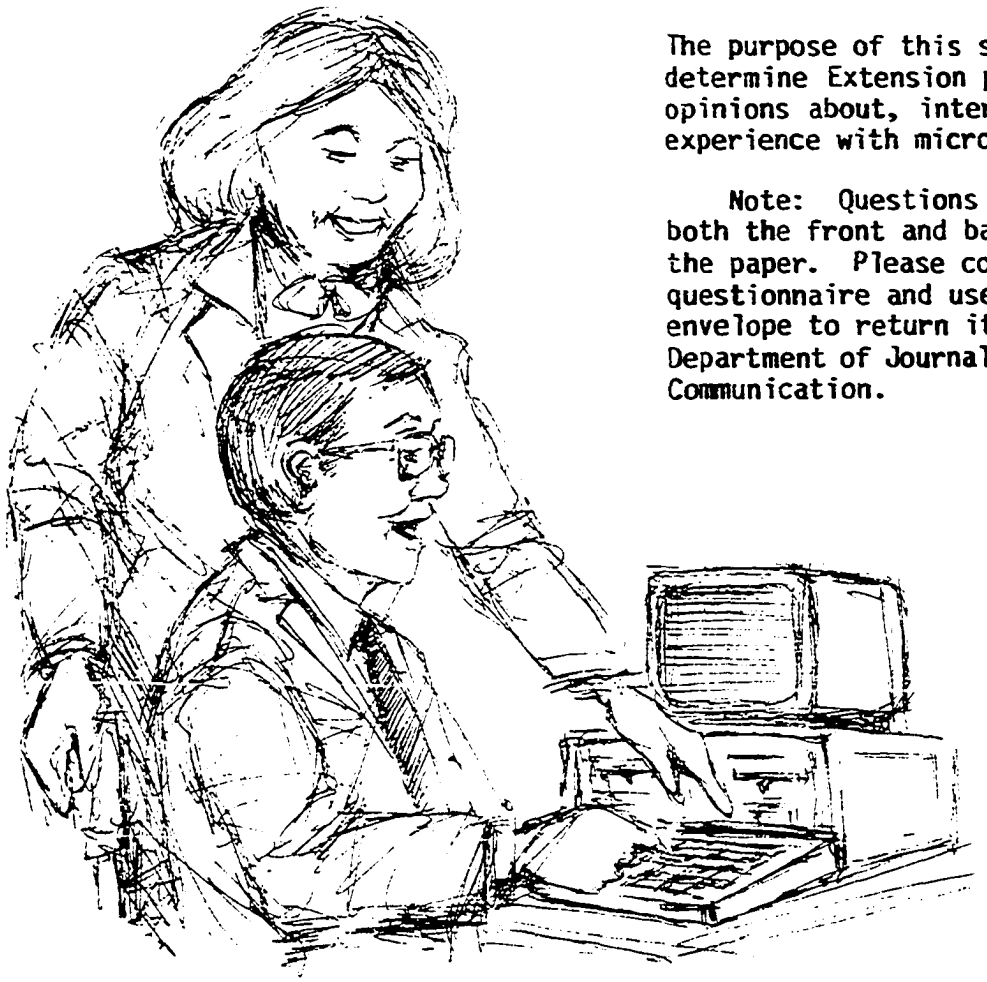
Special thanks are due to the Iowa Extension professionals who participated in this study, Iowa Extension Administration for their support of the study, and the Department of Journalism and Mass Communication for allowing the author to utilize their questionnaire. Sincere appreciation is also expressed to the Mississippi Cooperative Extension Service for allowing the author to pursue professional development during the last two years.

Eternal appreciation is expressed to the author's wife, Robbie, daughter Adelli, and son Gray for their love and support during trying times, and to the author's parents, Mr. and Mrs. C. S. Richardson, for their unending faith and support. For those unnamed family members and friends who have expressed their love and support in so many ways during the past two years, the author expresses a heartfelt "Thank you."

APPENDIX A. QUESTIONNAIRE

Microcomputer Opinions and Usage

A Study of Extension Professionals



The purpose of this study is to determine Extension professionals' opinions about, interest in, and experience with microcomputers.

Note: Questions appear on both the front and back sides of the paper. Please complete the questionnaire and use the enclosed envelope to return it to the Department of Journalism and Mass Communication.

Agricultural and Home Economics Experiment Station Project 2514
in Cooperation with
Iowa State University Cooperative Extension Service

Conducted by
The Department of Journalism and Mass Communication
Iowa State University
Ames, Iowa 50011

1. Some extension workers believe computers will be useful in their work. Others disagree. Please indicate to what extent you agree or disagree with each of the following statements.

	HOW STRONGLY DO YOU AGREE OR DISAGREE? (Please circle one answer for each statement)				
a. I feel that computers can help in my Extension work.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
b. The use of computers will likely depersonalize Extension's relations with its clients.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
c. I feel that I can learn to use the computer in more ways than I currently use it.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
d. Until computer programs for use by Extension workers are improved computers won't benefit me.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
e. Computers will make it easier to get information I need for my job, when I need it.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
f. I'm afraid that if I don't use computers, I'll be by-passed in Extension's reward system.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
g. I want to learn more about using computers.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
h. I would have a computer now, but they are too difficult to operate..	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
i. The use of computers will lead to a more centralized Extension Service--by-passing local workers..	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
j. I want to develop materials to be used on the computer.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
k. Extension's involvement with computers will aid mainly those clients who are already the most advantaged.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
l. I believe that computer programs should be developed by teams.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
m. I feel that I should have access to computer programs developed in other states.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE

Many applications have been suggested for computers in Extension. But the most useful applications probably vary with the job responsibilities and interests of individual Extension workers. We would like to know in what ways, if any, you think that computers could help you--directly or indirectly--carry out your Extension job responsibilities.

2. For each of the potential applications listed below, please indicate how useful computers will be to you in your extension work. In answering these questions, assume that the necessary equipment and programs will be available.

Administration and Other Office Functions

a. Word processing (electronic typing) for correspondence, manuscripts, newsletters, etc.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
b. Keeping financial and other required administrative records.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
c. Maintaining mailing lists and addressing mailings to clients.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
d. Preparing visual aids for presentations.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
e. Planning programs and scheduling my time	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE

Improved Communication

f. Providing rapid access to specific information I need, when I need it....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
g. Sending and receiving messages within Extension Service	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
h. Sending and receiving messages with clients and others outside Extension..	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE

Use as an Educational Tool

i. Use to show problem solutions in meetings and demonstrations.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
j. Run decision-aid programs such as Home Energy Audit to help individual clients solve problems.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
k. Use as a tool to teach clients how to use computers.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
l. Use for programmed instruction for clients and/or Extension staff....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
m. Use as an analytic tool to support an educational program.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE

3. In serving clients' computer needs, there are several roles which Extension could play. But, there are honest differences of opinion among Extension professionals as to which roles Extension should emphasize. We would like your opinion.

   For each of the six possible roles listed below, please indicate the extent to which you agree or disagree that this is a proper role for Extension in Iowa.

a. Extension should develop more computer programs (such as the Home Energy Audit) which help clients in decision-making.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
b. Extension should develop more computer-based instructional modules.	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
c. Extension should evaluate computer programs developed by the private sector and provide this evaluation to clients.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
d. Extension should teach clients about the potential applications, advantages, and disadvantages of computers as a management tool.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
e. Extension should teach clients how to interpret and use the information provided by computer programs.	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
f. Extension should teach clients guidelines for selecting computer equipment and programs.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE

4. What kind of computer equipment is available for your use at each of the following locations? (Please circle "Yes" or "No" for each system in each location.)

	In Your Extension Office		In same Building as Office		In a Nearby Building		In Your Home	
a. Microcomputer (such as Apple III)...	NO	YES	NO	YES	NO	YES	NO	YES
b. Dedicated word processing machine (such as Lanier or Wang).....	NO	YES	NO	YES	NO	YES	NO	YES
c. Terminal for the ISU Integrated Pest Management computer	NO	YES	NO	YES	NO	YES	NO	YES
d. Terminal for the ISU Computation Center and/or Administrative Data Processing computers	NO	YES	NO	YES	NO	YES	NO	YES

5. During the last 12 months have you thought seriously about, or worked toward getting funds for computer equipment for use in your extension office? This may involve either an initial purchase of computer equipment or adding to the equipment already available to you. It may be equipment you would personallly use, or it may be for use by persons whose work you supervise. (Circle one number)

1 NO) ——→ (Go to question 8)
2 YES)

6. Which of these statements best describes the current status of your decision-making about computer equipment for your Extension office? (Circle one number)

1 DEFINITELY DECIDED NOT TO ACQUIRE INITIAL/ADDITIONAL EQUIPMENT AT THIS TIME ——→ (GO TO QUESTION 8)
2 THOUGHT ABOUT IT, BUT NO DECISION AS YET
3 DEFINITLEY DECIDED TO ACQUIRE, BUT NEED FUNDS
4 IN THE PROCESS OF BUYING THE EQUIPMENT
5 EQUIPMENT ALREADY DELIVERED

7. Please describe the equipment you are considering, have decided to acquire, or have acquired.

_____

8. During the last 12 months have you thought seriously about, or worked toward buying your own computer equipment for use at home? This may involve either an initial purchase of computer equipment or adding to the equipment you already own. It may be equipment you would personally use, or it may be for use by other members of your family. (Circle one number)

1 NO ——→ (Go to Question 11)
2 YES

9. Which of these statements best describes the current status of your decision-making about personally owned computer equipment? (Circle one number)

1 DEFINITELY DECIDED NOT TO ACQUIRE INITIAL/ADDITIONAL EQUIPMENT AT THIS TIME ——→ (GO TO QUESTION 11)
2 THOUGHT ABOUT IT, BUT NO DECISION AS YET
3 DEFINITELY DECIDED TO ACQUIRE, BUT NEED FUNDS
4 IN THE PROCESS OF BUYING THE EQUIPMENT
5 EQUIPMENT ALREADY DELIVERED

10. Please describe the equipment you are considering or have decided to acquire for use in your home.

_____

11. Did you use a computer for any purpose during the past 12 months? (Circle one number)

1 NO) ⟶ (Go to Question 13)
2 YES)

12. During the last 12 months, about how frequently did you use a computer for each of the purposes listed below?

	Number of Times Used in Last 12 Months (Circle your answers)					
a. Preparing for instruction	NONE	1-2	3-9	10-19	20-49	50+
b. Indiviudalized instruction	NONE	1-2	3-9	10-19	20-49	50+
c. Analyses for clients	NONE	1-2	3-9	10-19	10-49	50+
d. Other assistance to clientele ..	NONE	1-2	3-9	10-19	20-49	50+
e. Keeping records	NONE	1-2	3-9	10-19	20-49	50+
f. Preparing reports	NONE	1-2	3-9	10-19	20-49	50+
g. Preparing written communication (letters, memos, pamphlets, etc)	NONE	1-2	3-9	10-19	20-49	50+
h. Communicating electronically with colleagues, other offices	NONE	1-2	3-9	10-19	20-49	50+
i. Using information in data bases/ information networks	NONE	1-2	3-9	10-19	20-49	50+
j. Data tabulation/analysis	NONE	1-2	3-9	10-19	20-49	50+
k. Collecting field or sample data	NONE	1-2	3-9	10-19	20-49	50+
l. Predicting prices, trends, etc.	NONE	1-2	3-9	10-19	20-39	50+
m. Model building	NONE	1-2	3-9	10-19	20-39	50+
n. Literature reviews	NONE	1-2	3-9	10-19	20-49	50+
o. Securing material in other state's computers	NONE	1-2	3-9	10-19	20-49	50+
p. Budgeting or other office mgt. .	NONE	1-2	3-9	10-19	20-49	50+
q. Other ways (indicate what): _____	NONE	1-2	3-9	10-19	20-49	50+
TOTAL USE FOR ALL PURPOSES	NONE	1-2	3-9	10-19	20-49	50+

13. During the last 12 months how many times did you do each of the following?

	Number of Times Used in Last 12 Months (Circle your answer)					
a. Use a computer program in another state's system (e.g., Ag Net)...	NONE	1-2	3-9	10-19	20-49	50+
b. Develop or help develop a computer program	NONE	1-2	3-9	10-19	20-49	50+
c. Help a business provide computer aid to clientele.....	NONE	1-2	3-9	10-19	20-49	50+

14. In total, approximately how many different computer software programs did you use at least once during the last 12 months?

_____ (Number)

15. Approximately how many times did you run computer analysis for clientele in the last 12 months?

_____(Number times) _____(Total number of clients)

16. Approximately how many people used a computer program under your direction or with your assistance during the past 12 months?

Please write in the number of people you helped to use a computer program during the past 12 months.

a. Farmers....._____

b. Homemakers....._____

c. Agribusiness personnel....._____

d. Non-farm clientele....._____

e. Youth....._____

f. Extension agents....._____

g. Undergraduate students....._____

h. Graduate students....._____

i. Other....._____

17. Within the past 12 months how often have you used the following sources to obtain information about computers?

	How often within the past year have you used this source for computer information (Please circle one answer for each item)				
a. How often have you read articles about computers in magazines or newspapers.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
b. Read books or manuals about computers or computer operations.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
c. Written or telephoned for information from computer manufacturers or dealers.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
d. Visited a computer dealer.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
e. Attended a computer exhibit at a fair or expo.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
f. Taken a computer short course or workshop from a computer dealer, college, or other organization.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
g. Taken a course in computer operation or programming from a college or trade school.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
h. Attended an Extension in-service training session on computers.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
i. Talked about computers with other Extension workers who are using them.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
j. Talked about computers with persons outside Extension who are using them.....	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES

18. Do you receive any of the following kinds of computer publications or newsletters? (Please circle "yes" or "no" for each type)

a. FARM COMPUTER PUBLICATIONS (such as Farm Computer News--published by Successful Farming; Agricultural Computing Newsletter--published by Doane's).....	NO	YES
b. GENERAL COMPUTER PUBLICATIONS (such as BYTE Magazine, Personal Computing, Kilobaud, etc.).....	NO	YES
c. MAGAZINES OR NEWSLETTERS PUBLISHED BY COMPUTER MANUFACTURERS OR DEALERS.....	NO	YES

19. During the past year, how many hours of computer training have you had?

____ NONE ——→ (Go to question 22)
____ 1/2 day or less
____ 1 day
____ 2 days
____ 3 days
____ 4 days
____ 5 days
____ More than 5 days

20. Who sponsored the training, and how useful was it?
(Check all which apply)

A. Who was the Sponsor? (please check)		B. How useful was that training? (please circle)			
Computer dealer	_____	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
Extension	_____	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
Community College	_____	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
Other	_____	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE

Who? _____

21. How helpful was the training in assisting you in doing the following?

a. Feel more competent in using a microcomputer.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
b. Assist fellow workers in using the microcomputer....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
c. Begin using the microcomputer in new ways for office management.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
d. Begin using the microcomputer in new ways to aid client decision-making.....	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE
e. Develop (write) new programs..	EXTREMELY USEFUL	QUITE USEFUL	SOMEWHAT USEFUL	OF LITTLE OR NO USE

22. Considering what your involvement with microcomputers is likely to be in the next year, what type of training would you like to have? (CHECK ALL THAT APPLY)

_____ None needed

_____ Basics of computer operation

_____ Use of specific programs (Specify) _____

_____ Writing specific programs (Specify) _____

_____ Other (Specify) _____

23. What form should this training take? (Please indicate your first preference with a 1, your second choice with a 2, etc.)

_____ Credit classes held off-campus

_____ Credit classes held on-campus

_____ In-service education

_____ Self-study materials

_____ Other (please specify)_____

PLEASE CONTINUE ON THE NEXT PAGE

So far we have asked questions mainly about computers. Now we would like to ask a few questions about your job and your personal background.

24. Here are several questions about your satisfaction with your present job. Please use the scale below to tell us how satisfied or dissatisfied you are.

	(circle your answer)				
a. How satisfied are you that you have been given enough authority by your superiors to do the job well?.....	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED
b. How satisfied are you with the progress you are making toward the goals which you set for yourself in your present position.....	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED
c. How satisfied are you that the people in Extension give proper recognition to your work?.....	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED
d. How satisfied are you with your present salary?.....	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED
e. How satisfied are you with the amount of time which you must devote to your job?....	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED
f. How satisfied are you with the prestige other Extension workers give to a position such as yours?.....	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED
g. How satisfied are you with your present job when you consider the expectations you had when you took the job?.....	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED
h. How satisfied are you that you are accepted as a professional expert to the degree to which you feel you are entitled by reason of your position, training, and experience?.....	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	SATISFIED	VERY SATISFIED

25. Now a few questions about your membership in professional organizations. These may include professional associations of extension workers or adult educators, or may be related to a subject-matter specialty such as nutrition, agronomy, or economics.

NUMBER

a. In how many professional organizations do you currently hold membership? _____

b. During the past 3 years, about how many state-level meetings of professional organizations have you attended?..... _____

c. During the past 3 years, about how many regional, national, or international meetings of professional organizations have you attended?.. _____

26. During the past 5 years, how many times have you been involved in each of the roles and activities listed below?

a. Served as an officer or committee chairman in a professional organization. ..... _____

b. Served as committee member in professional organizations ..... _____

c. Presented papers at meetings of professional organizations ..... _____

d. Presided over a section at professional meetings or served as a critic or respondent for papers presented ..... _____

e. Wrote articles for professional journals ..... _____

f. Reviewed books for professional journals ..... _____

g. Refereed articles for professional journals or reviewed manuscripts for publishers ..... _____

PLEASE CONTINUE ON THE NEXT PAGE

27. What is your job title? (Circle one number)

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1 COUNTY EXTENSION DIRECTOR
2 COUNTY HOME ECONOMIST
3 4-H AND YOUTH LEADER
4 OTHER (Specify) _____

28. For how many years have you been employed in:

_____ EXTENSION SERVICE?

_____ YOUR PRESENT JOB?

_____ YOUR PRESENT COUNTY?

29. Please indicate the highest level of formal education you have attained? (Circle one answer)

1 HAVE NOT COMPLETED BACHELOR'S DEGREE
2 COMPLETED BACHELOR'S DEGREE
3 CURRENTLY WORKING ON MASTER'S DEGREE
4 COMPLETED MASTER'S DEGREE
5 CURRENTLY WORKING ON DOCTORATE DEGREE
6 COMPLETED DOCTORATE DEGREE

30. Up until the time you finished high school, in which type or types of the communities listed below did you live for a year or more? (Circle as many as apply)

1 OPEN COUNTRY, FARM
2 OPEN COUNTRY, NON-FARM
3 TOWN OR VILLAGE OF LESS THAN 2,500
4 TOWN OF 2,500 TO 50,000 PEOPLE
5 CITY OF MORE THAN 50,000 PEOPLE

31. How old were you on your last birthday? _____ YEARS

32. Are you: _____ MALE _____ FEMALE

THANK YOU FOR YOUR COOPERATION!

Please place the completed questionnaire in
the enclosed envelope and mail it to:
Department of Journalism and Mass Communication
Iowa State University
Ames, Iowa 50011

JANUARY, 1984

27. What is your job title? 145 _____

28. What is your special subject-matter competence (e.g., nutrition, crops, community development)

_____

29. Do you hold an appointment in an academic department at ISU?

1 NO) ——→ (Go to Question 32)
2 YES)

30. What is that department? _____

31. What is your rank? (Circle one number)

1 INSTRUCTOR
2 ASSISTANT PROFESSOR
3 ASSOCIATE PROFESSOR
4 PROFESSOR

32. For how many years have you been employed in:

_____ EXTENSION SERVICE? _____ YOUR PRESENT JOB?

33. Please indicate the highest level of formal education you have attained? (Circle one answer)

1 HAVE NOT COMPLETED BACHELOR'S DEGREE
2 COMPLETED BACHELOR'S DEGREE
3 CURRENTLY WORKING ON MASTER'S DEGREE
4 COMPLETED MASTER'S DEGREE
5 CURRENTLY WORKING ON DOCTORATE DEGREE
6 COMPLETED DOCTORATE DEGREE

34. Up until the time you finished high school, in which type or types of the communities listed below did you live for a year or more? (Circle as many as apply)

1 OPEN COUNTRY, FARM
2 OPEN COUNTRY, NON-FARM
3 TOWN OR VILLAGE OF LESS THAN 2,500
4 TOWN OF 2,500 TO 50,000 PEOPLE
5 CITY OF MORE THAN 50,000 PEOPLE

35. How old were you on your last birthday? _____ YEARS

36. Are you: _____ MALE _____ FEMALE

THANK YOU FOR YOUR COOPERATION!

Please place the completed questionnaire in
the enclosed envelope and mail it to:
Department of Journalism and Mass Communication
Iowa State University

JANUARY, 1984

APPENDIX B. COVER LETTER

Iowa State University of Science and Technology Ames, Iowa 50011

University Extension

Address reply to:
Administrative Offices
Curtiss Hall
Telephone 515-294-4576

January 13, 1984

To: University Extension Professional Staff

From: Robert L. Crom, Dean

Two years ago, just as Iowa State University Extension began getting involved with micro-computers, we asked you for your opinions about how micro-computers can and should be used in Extension.

We have made many changes in the past two years. The number of micro-computers in county, area and state offices has increased dramatically. Staff members have explored many innovative ways of utilizing them as tools for keeping records, performing routine office tasks, and aiding clientele in decision making.

We are again asking for your opinions and advice. We in Extension administration want to keep open lines of communication with you as a staff member. We want to know your interests and concerns as we continue to explore uses of micro-computers in our programs. The enclosed questionnaire was prepared in cooperation with researchers in the Department of Journalism. It is being mailed to all professional employees within University Extension. Your answers can help us assess where we are and possible future directions. I urge your cooperation in this study no matter what your experience with, interest in, or current involvement with computers happens to be.

Let me hasten to add that this survey is not intended to evaluate your personal job performance. Your individual responses will remain confidential with the research team in Journalism and Mass Communication. They will provide Extension with statistical summaries that do not identify individuals. If you have specific questions about the survey, please direct them to the project leader, Cliff Scherer, 124 Press Building, ISU. His office phone number is 294-4340.

We will appreciate your completing and returning the questionnaire at your earliest convenience. If at all possible, please try to do so within the next week to 10 days. A postage-paid reply envelope is enclosed.

Enclosures