MICROCOMPUTER COMPETENCIES FOR AGRIBUSINESS IN BILLINGS, MONTANA, BUSINESS AREA

by

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ABSTRACT

The purpose of this study was to determine perceptions of managers of agribusinesses concerning present and future microcomputer competencies needed by entry-level employees in six taxonomy areas of agriculture/agribusiness as identified in the Billings, Montana, business area: agriculture supplies/services, agriculture mechanics, agriculture products, agriculture resources, agriculture production, and ornamental horticulture. To accomplish the purpose and objectives of this study, a stratified random sample of 40 businesses was selected from a total population of 329. Interviews were conducted using a questionnaire that was developed by the researcher. The questions on the instrument gathered information about the business and the use of 39 selected competencies. The competencies were separated into four areas: basic operations, software, hardware, and programming.

The major findings of this study were: 1) corporate agribusinesses who deal primarily in sales and service are the businesses which are most likely to be using microcomputers; 2) the most important microcomputer competencies for entry-level employees are software competencies and the least important competencies for entry-level employees are programming competencies; 3) agribusinesses are currently using computers within their business and indicate a need for employees to possess these competencies at entry level in order to be competent employees. Nineteen competencies were frequently used by three-fourths of the agribusinesses and were perceived to be extremely important, very important, or important for entry-level agribusiness employees; and 4) half of the agribusiness employees who use microcomputers daily do so one-third of the work day.

CHAPTER I

INTRODUCTION AND METHODOLOGY

Introduction

With recent emphasis on computer literacy and operation by agriculture industry, agriculture education has assumed another responsibility--that being, to develop entry-level computer competencies for prospective employees. It is estimated that there will be an eighty-five percent increase or more in computer-related jobs for the year 1990. Current unemployment levels point out the immediate need to train people in agribusiness with employable skills.

Traditionally, the responsibility of having sufficient numbers of computer competent individuals to meet the manpower needs of agribusiness for the coming years lies with agriculture education. It is crucial to have agribusinesses work closely with agricultural educators to cooperatively identify desired workable computer competencies for entry-level employment (Foster, 1982, p. 5).

Competencies should be the building blocks of any vocational curriculum. The ingredients needed to build a strong computer curriculum come from agribusiness itself. By surveying agribusiness and obtaining current computer competencies, agriculture education can then develop training programs for prospective entry-level employees. The benefits of this approach will be an increase in number of competent computer

trained entry-level employees for the different agribusiness taxonomy areas in the coming years.

Purpose of the Study

The purpose of this study was to determine perceptions of managers of agribusinesses concerning present and future microcomputer competencies needed by entry-level employees in six taxonomy areas of agriculture/agribusiness as identified in the Billings, Montana, business area: agriculture supplies/services, agriculture mechanics, agriculture products, agriculture resources, agriculture production, and ornamental horticulture.

Need of Study

Employment statistics currently compiled by the United States Census Bureau indicate there will be an increase of .9 million computer jobs, bringing the expected total of computer-related occupations to 2.1 million, for the year 1990 ("Jobs for Two Million Workers," 1982, p. 30). This statistic is a bright spot for employees facing recession, unemployment, factory closure, and small business bankruptcy. The data collected from this study of microcomputer competencies for agribusiness will provide a foundation upon which to build curriculum and training programs.

As agricultural businesses incorporate the use of computers to meet increasing time demands, employees with computer competencies in agribusiness will be in demand. Competencies needed by these businesses will need to be identified and will become the building blocks for the development of agribusiness curriculum for agriculture education.

Entry-level computer competencies will enhance employment opportunities for students who complete agricultural training at the secondary or post-secondary levels.

Regardless of the level of training, a compiled list of competencies, validated by agribusiness and agricultural educators, will provide for a more harmonious and complete training process. Developing a training program based on the needs of actual jobs is a key to developing a strong program in microcomputer curriculum for entry-level employment.

This study proposes to take a look at the needs of Billings, Montana, agribusinesses in the specific area of microcomputer competencies for entry-level employees. Since Billings is the most heavily populated agribusiness area of Montana, it will also reflect the state's need in computer competencies. Presently no current studies address this topic.

The outcomes of this study will 1) identify microcomputer competencies needed in agribusiness, 2) assist in the development of competency-based curriculums for agricultural education, and 3) help make instruction directly related to employment. Should these goals be accomplished, a foundation will have been laid for Montana vocational agricultural teachers so that they can implement microcomputer competency-based instruction in the agribusiness area.

Objectives

The objectives to be addressed by this study are:

1. To identify present and future entry-level microcomputer competencies required for employment in any one of the six taxonomy areas (agriculture supplies/services, agriculture mechanics, agriculture products, agriculture resources, agriculture production, and ornamental horticulture).
2. To identify a list of common microcomputer competencies in six taxonomy areas for entry-level employment in agribusiness.
3. To determine the method and the extent of on-job training now being provided by agribusinesses operating in the Billings, Montana, business area.
4. To rank selected microcomputer competencies according to their importance and frequency of use by entry-level employees in agribusiness.
5. To identify characteristics of those agribusinesses who are incorporating microcomputers.

Assumptions

The assumptions for this study were:

1. That the population for agribusinesses and their classification, in the Billings business area, could be determined by using the telephone Yellow Pages.
2. That the agribusinesses and persons responding knew the firm's use of microcomputers and the competencies that were needed by present and future employees.

Limitations

This study was limited to those consenting agribusinesses located in Billings, Montana, who were utilizing computers. The population was limited to those agribusinesses who advertised in any of the six taxonomy areas of the Yellow Page section of the October, 1983 edition of the Billings, Montana, Mountain Bell Telephone Company directory and using the local Billings telephone prefix numbers.

Definitions

1. Computer/microcomputer: Those electronic technological tools used to manipulate information (e.g., microcomputer, main frame computer, or programmable calculator).
2. Microcomputer competencies: Attitudes, skills, and/or knowledge required to manipulate or operate microcomputers successfully.
3. Entry level: Beginning point for inexperienced employees entering an occupation for the first time.
4. Agribusiness: Occupations which evolve out of a blend of agriculture and business, encompassing a variety of services associated with the manufacturing and distribution of farm resources.
5. Agribusiness manager: Individual responsible for the overall direction of the agricultural related business and its goals (e.g., general manager).
6. The six taxonomy areas of agribusiness:
   a. Agriculture supplies/services: Those businesses which provide supplies to farmers and ranchers and provide services needed to utilize these supplies (e.g., hardware, feed store, fertilizer plant).

b. Agriculture mechanics: Businesses which sell and service agricultural power units, machinery, and related equipment (e.g., farm implement dealer, agricultural mechanic shop).

c. Agriculture products: Businesses which assemble, sort, test, grade, store, and market farm and ranch products (e.g., elevator, feed mill, milk processing plant).

d. Agriculture resources: Businesses concerned with the principles and practices necessary to conserve and improve our natural resources (e.g., ASCS, SCS, FHA, banks, governmental agencies).

e. Agriculture production: Businesses involved in the production, processing, management, marketing, and utilization of food or feed products (e.g., grain farm, vegetable farm, livestock farm).

f. Ornamental horticulture: Businesses which produce, distribute, and utilize ornamental crops principally for ornamental or aesthetic purposes (e.g., nursery, landscaping, lawn, or turf management).

Methodology

The methodology used for this study was broken down into four major areas: population sampling, design, data collection, and data analysis. A detailed description of each section follows.

Population Sampling

This study worked solely with agribusinesses in Billings, Montana. The population of agribusinesses was compiled from the Yellow Pages of the Billings Mountain Bell telephone director for October, 1983. The names of the agribusinesses to be included were taken from agriculture advertisements.

A total of 329 agribusinesses were recorded by name, address, and telephone number and stored on a microcomputer disk for later use. Of thses agribusinesses, 204 were eventually contacted. The identified agribusinesses were stratified into six taxonomy areas as previously defined. The taxonomy areas and the numbers of each were as follows: 1) agriculture supplies and services, 96; 2) agriculture mechanics, 75; 3) agriculture products, 69; 4) ornamental horticulture, 53; 5) agriculture resources, 29; and 6) agriculture production, 6. The total number of agribusinesses in each taxonomy area, when compared to the total population, determined the size of the stratified random sample (for example: total number of agribusinesses [329], of which 75 were identified as agriculture mechanics). The formula used to determine the number of agriculture mechanics businesses to be interviewed was 75/329 = 22%. This percent was then multiplied by 40 (random sample desired) to obtain a stratified sample of nine (40 x 22% = 9). A computer program was written to randomly select and print a numerical list of all (75) agriculture mechanics businesses previously recorded. The first nine businesses listed formed the random sample for this taxonomy area. If any of the nine originally selected stratified random sample units failed to meet the criteria set forth, then the next one or

ones on the list were selected to be interviewed. This process was repeated as often as needed to obtain the nine consenting agricultural mechanics businesses. The sampling units for the remaining taxonomy areas were obtained in a similar manner.

Design of Instrument

The intent of the study was to develop a composite list of competencies about microcomputers used by entry-level employment personnel in agribusiness. After the identification of the agribusiness population units that were to be contacted, an interviewing instrument was constructed to solicit specific information from agribusiness managers. To aid in understanding the businesses, a portion of the instrument solicited information on the general character of the agribusinesses. Characteristics included areas of employment, employees, training, working hours, and general working conditions.

A general business and employer/employee information section was developed in order to obtain a total picture of the agribusiness. An additional section containing a list of expected agribusiness competencies in microcomputers was developed by brainstorming with committee members, vocational agriculture teachers, through a review of literature, and consultations with agribusinesses in Laurel and Sheridan, Montana. Space was left on the instrument to allow for additional competencies as identified by agribusiness managers. A scale was developed which allowed for the verification of use of competencies as presented, for the rating of the competencies, and for the frequency of use of the respective competencies.

The instrument was reviewed for functionality and clarification by members of the researcher's graduate committee. Once accepted by the committee, the researcher conducted a pilot test with a non-population agribusiness. The instrument was further refined after the pilot test. Upon completion of the instrument, the researcher was ready to conduct personal interviews.

Collection of Data

Prior to the actual interview to collect data, a letter and sample instrument were mailed to randomly selected agribusinesses by taxonomy area (see Appendix A). This allowed all closely related agribusinesses to be contacted within a close time span. An entire taxonomy group was interviewed before moving on to the next group. The letter and sample instrument better acquainted the manager with the intent of the study before the interview. The manager at times relayed the letter to other persons who would be interviewed. One week after the mailing of the letter and a sample instrument, a follow-up telephone call was made to the manager in order to determine if the business utilized microcomputers and to set up an interview time and date. If a business did not use microcomputers or refused to be interviewed, the next random sample unit was brought into the sample. This new sample unit was then mailed a letter and sample instrument. One week later they were telephoned by the researcher.

At each interview, both manager and researcher viewed and read the instrument. The researcher, after developing a standard set of examples, verbally and systematically solicited responses, completing

each item of the instrument. The researcher recorded the data as required by the instrument. The researcher recorded the data as required by the instrument. A time period of October of 1984 through March of 1985 was selected to provide convenience to the managers, the agribusinesses, and the researcher.

Data Analysis

Upon completion of the selected interviews, the data were summarized. Competency totals were categorized into yes response, no response, mean importance, and frequency of use (daily, weekly, monthly, and yearly). Standard deviation was calculated by using the micro-computer program MSUSTAT. The program used was SUMSTAT, a part of the MSUSTAT statistical package. The thirty-nine competencies were separated into four areas: basic, software, hardware, and programming. Within each area the competencies were ranked by mean scores or frequency of use. Some instrument questions were split to accommodate data analysis.

General business characteristic information was hand-tabulated and placed in table format to be revised and manipulated to show present data. Similar to competency data, SUMSTAT was used for standard deviation. Generally, each question's data appear in table format. Narratives were then written for data in each table.

CHAPTER II

REVIEW OF LITERATURE

Even with the aid of a computer search, literature found during the review of literature was limited, which in itself indicates the need for the study. The information seemed to be fragmented; thus it became necessary to review each segment separately. Computers, agribusinesses, educational competencies, and the interview process made up the key areas of literature review. Seldom were these four areas mentioned in total within any one reference.

In 1978 an expected 1.2 million jobs were related to computers. By year 1990 an estimated total of 2.1 million jobs will be related to computer use. This shows an 85 percent increase over this twelve-year period. Many individuals feel the biggest wave of computer influence will not arrive until the turn of the century. Will education, industry, and private life be prepared for the major influence of computers? Preparation is the key ("Jobs for Two Million Workers," 1982, p. 30).

If education could be measured by numbers of computers, some people would say, "education is prepared." In 1982 over 101,000 computers could be found in the public schools of the United States. Other people feel education is far behind industry in utilizing and instructing computer operations. In this case the expected ratio of one computer to sixteen high school students by 1985 will have little impact

on properly preparing for the computer era. A prediction of thirty times more computer sales in the next fifteen years may silence the most skeptical educators, businessmen, or philosophers. The preparation for the computer era must start now (Camp, 1982, p. 40).

The vast majority of researchers agree that computers are here to stay. Just what kind of impact they produce on society, education, or employment is the most overpowering concern. Every level of education has been confronted by the computer era to varying degrees. Industry, business, and family homes have advanced further in computer operations than some schools. Limited research has actually addressed the effects of computers. "Too soon to tell" is a common feeling. With industries in manufacturing, services, wholesale/retail, and finance/insurance/real estate making up 80 percent of the current computer work force, research has concentrated in the public sector ("Jobs for Two Million Workers," 1982, p. 30).

Computers do not lend themselves to just one industry. A variety of businesses utilize computers. This makes computers free from the influence of recession and depression. Agribusiness personnel using microcomputers must learn to be flexible and adapt themselves for a large variety of industries. Agribusiness is an integrated force of industry and business. Recent findings by the Department of Applied Behavior Science at the University of California at Davis, May 1979, found 26 percent of current Yolo County agribusinesses had brought computers into the business operations. Another 15 percent indicated immediate future plans to include computer systems for the agribusiness. If Yolo County is an indication of nationwide agribusiness, an estimated

40 percent of Yolo agribusinesses now utilize computers (University of California at Davis, 1979, p. 100).

Undoubtedly, computers are useful to agribusiness, but to what extent? The number one current use of computers in agribusiness was that used for payroll operations. Second and third most often used tasks were ordering and inventory, respectively (University of California at Davis, 1979, p. 100). Agribusiness is primarily formed by small business operations with limited employee work forces. Yet small businesses provided 87 percent of the new jobs between the years of 1969 to 1979 (Nelson, 1982, p. 181). The work force of agribusiness is influenced by computers and will need to become computer literate.

Education competencies for computers in agriculture is the catalyst for a productive, economical, and socially acceptable work force. John S. Russell (1980), in a recent article of the Vocational Education Journal, reflected on the lack of trained talent to meet present and future needs by owners and managers of businesses. Computers are the tool to management. Constructive use of these tools will be dependent on the training received. Nechville (1979) points out, "A good example of identifying an agribusiness need is to simulate it with a computer." The quote itself points out the need to identify the competencies of agribusiness and then put students through a realistic example. Sometimes the tool used in real situations may be a computer in itself.

The concept of a realistic learning center for training of prospective employees of agribusiness is ideal and generally unattained. Fog and Lindahl (1980) stress the importance of involving agribusiness

in training of people for prospective entry-level employment. Experience in related job functions is the number one criteria for hiring agribusiness employees (University of California at Davis, 1979, p. 100). The best type of education is training that not only provides information and knowledge, but hands-on occupational experience as well.

Although fragmented, the literature does tie in the importance of computer competencies for agribusiness training of entry-level employees. As the computer era continues to explode into all areas of agribusiness, it is crucial to begin preparation for computer competencies with joint efforts between agribusiness and agricultural education.

"As a result of person-to-person interviews, the teacher has a greater understanding of the needs of agriculture workers in business and industry" (Mannebach, 1983, p. 7). In order to meet the needs of students through competency instruction, design, and training, it is imperative that the researcher get out into agribusiness locations and identify the competencies needed to effectively operate microcomputers.

Bennett and Legacy suggest when comparing mailed instrumentation to actual interviews, the interview technique when used to identify and classify tasks to be performed by entry-level employees in agribusiness collects more valid information. "Clearly the personal-interview respondents report a different work description for beginning workers" (Bennett and Legacy, 1980, p. 32). This statement points to the major concern of obtaining correct, useful information for entry-level employees. By direct contact with personnel in the agribusinesses, the general feeling is quite positive towards a more valid and useful research.

Many things also underline the desire to interview respondents as compared to mailed surveys or other techniques. Often personal contact with industry produces a positive image of agriculture education as educators attempt to include industry in the identifying of competencies needed by prospective employees. Personal contact could be a benefit towards tours, guest lectures, work placement sponsorship, and future employment--all of which help the local teacher in providing a quality education for his/her students.

CHAPTER III

PRESENTATION OF DATA

Population Information

The objectives of the study were quantified by data collected from interviews of random sample agribusinesses who advertised in the Yellow Pages of the Billings telephone directory and were in the Billings business area. Following a telephone call to determine the extent to which the microcomputer was incorporated in the agribusiness, arrangements were made for a personal interview with a representative of the agribusiness.

A total of 40 agribusiness representatives were interviewed to provide data as to the type of agribusiness they perceive themselves to be. Each interviewee was asked to choose among one or more of the six taxonomy areas.

Agribusiness Characteristics

The self-perceptions of agribusiness representatives are presented in Table 1. As the data in Table 1 indicate, 22 (55 percent) of the agribusinesses derived more than 51 percent of their income from the agriculture sales and service taxonomy area. Only 5 percent (2) of the agribusinesses classified themselves as agriculture mechanics or agriculture production. Ornamental horticulture comprised 7.5 percent

(3) of the sample, and agriculture products, 10 percent (4). Seven agribusinesses (17.5 percent) were classified as "other" because they did not derive 51 percent of their income from any one taxonomy area. The original taxonomy identification procedure for random sampling by the researcher proved to be different than the self-perceptions of the agribusiness representatives.

Table 1. Agribusiness's self-perception by taxonomy area.

Area	Number	Percent
Agriculture supply and service	22	55.0
Agriculture mechanics	2	5.0
Agriculture products	4	10.0
Agriculture resources	--	--
Agriculture production	2	5.0
Ornamental horticulture	3	7.5
Other*	7	17.5

* Mixture of the six areas, having no majority in any one area.

Data in Table 2 give evidence to show the common agribusiness types which were interviewed. Eighty-five percent (34) of those persons interviewed classified their agribusiness as a corporation type of agribusiness. Ten percent (4) classified themselves as sole proprietor.

Data presented in Table 3 reveal the range of microcomputer experience of personnel in agribusinesses. Microcomputers were used in 45 percent (18) of the agribusinesses four or more years prior to the interview and they had 3.1 microcomputer stations per business. Twelve percent (5) of the agribusinesses had three years of experience with

microcomputers. Twenty percent (8) of the agribusinesses had two years of experience and 22.5 percent (9) had one year of experience. Although data in Table 3 do not show the average number of microcomputer stations per agribusiness, it was determined that there were an average of 2.8 microcomputer stations per agribusiness.

Table 2. Type of agribusiness.

Type	Number	Percent
Sole Proprietor	4	10.0
Partnership	1	2.5
Corporation	34	85.0
Franchise	--	--
Owned	--	--
Leased	--	--
Other (government)	1	2.5

Table 3. Years of experience and number of microcomputers used by agribusiness.

Year	Number	Percent	$\bar{X}$
One	9	22.5	1.6
Two	8	20.0	3.8
Three	5	12.5	2.2
Four or more	18	45.0	3.1

Data in Table 4 show the number of full and part-time employees of the agribusiness that were interviewed. Dividing the data into male and female categories allowed for further understanding of employment. The

average number of part-time employees was 39.73 males and 20.17 females, giving insight to the seasonality of the agribusinesses. The mean number of full-time employees per agribusiness was 11.66 males and 5.53 females. A further notation of data in Table 4 reveals a large standard deviation in the number of full-time and part-time employees.

Table 4. Number of full- and part-time employees.

	Full-time			Part-Time		
Employment	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Male	596	39.73	105.30	443	11.66	17.81
Female	363	20.17	63.36	210	5.53	7.16

Data in Table 5 reveal the level of education required for entry-level employment in agribusinesses. One interviewee felt his company's employees needed no special education requirements, while the other 39 indicated a high school education was required. The data reveal that agribusinesses need employees with varying levels of education. Fifty percent (20) of the interviewees indicated a baccalaureate degree was

Table 5. Level of education required of entry-level employees.

Level of Education	Number*	Percent
High school diploma	39	97.5
Associate degree	14	35.0
Baccalaureate degree	20	50.0
No requirement	1	2.5

* May select more than one level.

required for some positions, and 35 percent (14) indicated an associate degree was needed for some positions.

The examination of data in Table 6 shows the rating of entry-level employees on their microcomputer competencies. Respondents rated 85 percent (36 + 49) of their current entry-level employees as having average or lower than average microcomputer competencies. Sixteen percent (13 + 3) of the interviewees rated their entry-level employees as having above-average or higher microcomputer entry-level competencies.

Table 6. Rating of entry-level employee microcomputer competencies by agribusiness.

Rating	Number	Percent
Low	14	35.9
Average	19	48.7
Above-average	5	12.8
High	1	2.6

Data in Table 7 reveal that company training for microcomputer competencies averaged 102 hours during the first year of employment. Following company training, self-instruction was the next most frequently used method of developing microcomputer competencies. Agribusiness utilized self-instruction training 68.5 percent of the time for first-year employees with employees studying an average of 54 hours. Twelve agribusinesses (30 percent) used contracted and private vendor training. Public education was utilized by only 15 percent (6) of the agribusinesses in providing microcomputer training. The data in Table 7 further reveal the range of hours spent in training by agribusinesses during the

first year of employment. Company training revealed a range of 800 hours per employee to two hours per employee. A large standard deviation in all types of training can be noted.

Table 7. Methods and time utilized to train first-year employees on microcomputers.

Method*	N	Percent	Hour/Employee Range High	Low	$\bar{X}$	SD
Company	37	92.5	800	2	102.20	144.20
Self-instruction	27	67.5	300	1	54.74	77.97
Contracted	12	30.0	55	2	14.92	16.41
Private vendor	12	30.0	40	2	14.00	12.99
Public education	6	15.0	100	2	27.50	36.21

* Respondents could select more than one method.

Data in Table 8 show that for those employees using the microcomputer on a daily basis, 22.5 percent (9) interact with microcomputers for one to two hours per day, 25 percent (10) interact for two to three hours, and 20 percent (8) interact for three to four hours per day. The employees in 32 percent (13) of the agribusinesses surveyed interacted with microcomputers more than five hours per day.

Table 8. Computer use in hours per day within agribusinesses.

Hours Per Day	Number	Percent
One to two	9	22.5
Two to three	10	25.0
Three to four	8	20.0
Greater than five	13	32.5

Basic Competencies

The data in Tables 9 through 13 show how five specific microcomputer competencies rated when analyzed by agribusiness. These five microcomputer competencies are basic in nature and are part of a total of 39 microcomputer competencies gathered through research. All 39 microcomputer competencies were divided into subheadings: 1) basic, 2) software, 3) hardware, and 4) programming.

Data in Table 9 show the ranked importance of basic microcomputer competencies as rated by the mean scores. An importance scale of: 5 = extremely important, 4 = very important, 3 = important, 2 = some importance, and 1 = no importance was used to score and tabulate the data. When interpreting mean scores, the following range was used for each importance category: 5 to 4.5 = extremely important, 4.49 to 3.5 = very important, 3.49 to 2.5 = important, 2.49 to 1.5 = some importance, and 1.49 to 1 = no importance. Standard deviation (SD) accompanies the ranked importance of each basic microcomputer competency. The basic competency, "demonstrate a positive, non-fearful attitude towards microcomputers," ranked highest of the five basic competencies with a mean score of 4.18, which would be considered very important.

Basic microcomputer competencies now utilized by entry-level employees are shown by data in Table 10. Ninety-two and one-half percent (37) of the respondents indicated that entry-level employees could "demonstrate a positive, non-fearful attitude towards microcomputers," while 87.5 percent (35) of the interviewees reported that beginning employees were "demonstrating the ability to comprehend and apply

the operator's manual," and 72.5 percent (29) indicated they were able to "describe the use of microcomputers in the agricultural industry."

Table 9. Importance of basic microcomputer competencies.

Basic Competencies	$\bar{X}$*	SD
Demonstrate a positive, non-fearful attitude towards microcomputers.	4.18	1.36
Demonstrate ability to comprehend and apply operator's manual.	3.95	1.18
Describe the use of microcomputers in the agricultural industry.	3.18	1.38
Define microcomputer terminology.	2.95	1.36
Describe the limitations of microcomputers.	2.88	1.32

* 5 to 4.5 = extremely important; 4.49 to 3.5 = very important; 3.49 to 2.5 = important; 2.49 to 1.5 = some importance; 1.49 to 1 = no importance.

Table 10. Basic microcomputer competencies presently used by entry-level employees.

Basic Competencies	Use			
	Yes		No	
	Number	Percent	Number	Percent
Demonstrate a positive, non-fearful attitude towards microcomputers.	37	92.5	3	7.5
Demonstrate ability to comprehend and apply operator's manual.	35	87.5	5	12.5
Describe the use of microcomputers in the agricultural industry.	29	72.5	11	27.5
Describe the limitations of microcomputers.	26	65.0	14	35.0
Define microcomputer terminology.	21	52.5	18	45.0

Data in Table 11 address the future use of the basic microcomputer competencies and rank the competencies by frequency of favorable (yes) responses. In the future, all basic microcomputer competencies for entry-level employees, as shown in Table 11, are perceived to be needed within 80 percent or more of the agribusinesses. All agribusiness personnel (100 percent) interviewed indicated that future employees need to "demonstrate a positive non-fearful attitude towards microcomputers."

Table 11. Future microcomputer basic competencies needed for entry-level employment.

Basic Competencies	Need			
	Yes		No	
	Number	Percent	Number	Percent
Demonstrate a positive, non-fearful attitude towards micro-computers.	40	100.0	--	--
Demonstrate ability to compre-hend and apply operator's manual.	38	95.0	2	5.0
Describe the use of micro-computers in the agricultural industry.	34	85.0	6	15.0
Describe the limitations of microcomputers.	32	80.0	8	20.0
Define microcomputer terminology.	32	80.0	7	17.5

The reader should recall that data in Table 10 show 52.5 percent of the present employees can "define microcomputer terminology," whereas data in Table 11 reveal that 80 percent of future employees should possess this microcomputer competency.

Data in Table 12 show the estimated daily and weekly frequency of use for each basic microcomputer competency. These are ranked by the

agribusiness's perceived daily occurrence for each competency. A mean score accompanies the competency to show the number of times in a day or week the competency may be performed. "Demonstration of positive, non-fearful attitude towards microcomputers" was perceived by 82.5 percent (33) of the interviewees to be performed on the average of 11.6 times daily. The other four basic microcomputer competencies were used 5 or 6 times daily. The weekly average use of the basic microcomputer competencies range from twice weekly to 1.2 times weekly.

Table 12. Use of microcomputer basic competencies by agribusiness.

Basic Competencies	Frequency					
	Daily			Weekly		
	N	%	$\bar{X}$	N	%	$\bar{X}$
Demonstrate a positive, non-fearful attitude towards micro-computers.	33	82.5	11.6	4	10.0	2.0
Demonstrate ability to compre-hend and apply operator's manual.	24	60.0	6.3	3	7.5	1.7
Describe the use of micro-computers in the agricultural industry.	23	57.5	5.1	12	30.0	1.8
Describe the limitations of microcomputers.	14	35.0	5.5	12	30.0	1.2
Define microcomputer terminology.	12	30.0	5.1	8	20.0	1.6

It is noted from data in Table 12 that there is a 5.1 perceived average daily occurrence for the microcomputer competency, "define microcomputer terminology," while data in Table 10 show 52.5 percent of present employees can "define microcomputer terminology."

Data outlined in Table 13 address the monthly and yearly frequency of occurrence for basic competencies. "Describing the limitations of microcomputers" was the most frequently selected competency by respondents, with 25 percent (10) indicating it to be used monthly with a mean score of 1.5 times per month. The ability for entry-level employees to "comprehend and apply the operator's manual" averaged 6 times per year.

Table 13. Monthly and yearly use of basic microcomputer competencies.

Basic Competencies	Frequency					
	Monthly			Yearly		
	N	%	$\bar{X}$	N	%	$\bar{X}$
Describe the limitations of microcomputers.	10	25.0	1.5	1	2.5	1.0
Describe the use of microcomputers in the agricultural industry.	6	15.0	1.3	1	2.5	3.0
Demonstrate ability to comprehend and apply operator's manual.	3	7.5	2.0	1	2.5	6.0
Define microcomputer terminology.	3	7.5	1.3	2	5.0	3.0
Demonstrate a positive, nonfearful attitude towards microcomputers.	2	5.0	1.5	--	--	--

Software Competencies

The data in Tables 14 through 18 show how 16 specific microcomputer competencies were rated by agribusiness interviewees. These 16 microcomputer competencies are specific competencies dealing with the use of software and are part of the 39 total microcomputer competencies gathered through research.

Data in Table 14 show the ranked importance of microcomputer software competencies according to mean scores. An importance scale of: 5 = extremely important, 4 = very important, 3 = important, 2 = some importance, 1 = no importance, was used to score and tabulate the data. Standard deviation (SD) accompanies the ranked importance of each

Table 14. Importance of microcomputer software competencies.

Software Competencies	$\bar{X}$*	SD
Use software to maintain business records.	4.33	0.99
Locate a program using a catalog or menu.	4.23	0.90
Retrieve and execute a program.	4.18	0.90
Operate a computer accounting program.	4.13	1.22
Save and copy a program.	3.90	1.29
Properly store, transport & handle software.	3.74	1.31
Interrupt or exit from a program.	3.73	1.22
Use software developed for the agricultural industry.	3.62	1.41
Operate a computer inventory program.	3.61	1.42
Use the microcomputer as a word processor.	3.28	1.56
Use a data base management program.	3.24	1.52
Properly label software.	3.06	1.55
Lock/unlock a software program.	2.90	1.59
Initialize or format software.	2.89	1.56
Use VISICALC or other spreadsheet programs.	2.67	1.49
Delete a program from software.	2.31	1.45

* 5 to 4.5 = extremely important; 4.49 to 3.5 = very important; 3.49 to 2.5 = important; 2.49 to 1.5 = some importance; 1.49 to 1 = no importance.

software microcomputer competency. The software competency, "use software to maintain business records," ranked highest among the 16 software competencies with a mean score of 4.33, which is considered very important. The competencies which were rated as very important (having a mean score of 3.50 to 4.49) were: 1) "locate a program using a catalog or menu," 2) "retrieve and execute a program," and 3) "operate an accounting program." Five of the software competencieshad mean scores between 3.49 and 2.50 and are considered to be important. "Deleting a program from software" was considered to be of some importance (2.31).

Microcomputer software competencies presently used by entry-level employees are identified by the data in Table 15. Ninety percent (36) of the interviewees reported that entry-level employees were able to "retrieve and execute a program," while 80 to 87.5 percent of the interviewees indicated that entry-level employees were "using software to maintain business records," "locating a program using a catalog or menu," and "interrupting or exiting from a program." The ability to use word processing, data base management and spreadsheet programs were used by entry-level employment in only 37.5 percent (15) of the agribusinesses studied.

The reader should recall that data in Table 14 reveal that to "operate a computer inventory program" is very important (3.6). However, data in Table 15 show only 52.5 percent (21) of the entry-level employees used this microcomputer competency. The data in Table 14 also show that use of data base management (3.28) and use as a word processor (3.24) are rated as important. Data in Table 15 reveal that

Table 15. Microcomputer software competencies presently used by entry-level employees.

Software Competencies	Use			
	Yes		No	
	Number	Percent	Number	Percent
Retrieve and execute a program.	36	90.0	4	10.0
Use software to maintain business records.	35	87.5	5	12.5
Locate a program using a catalog or menu	34	85.0	5	12.5
Interrupt or exit from a program.	32	80.0	8	20.0
Save and copy a program.	29	72.5	10	25.0
Operate a computer accounting program.	27	67.5	11	27.5
Use software developed for the agricultural industry.	27	67.5	13	32.5
Properly store, transport, and handle software.	26	65.0	12	30.0
Properly label software.	22	55.0	17	42.5
Operate a computer inventory program.	21	52.5	18	45.0
Lock/unlock a software program.	17	42.5	22	55.0
Initialize or format software.	16	40.0	20	50.0
Use the microcomputer as a word processor.	15	37.5	25	62.5
Use a data base management program.	15	37.5	23	57.5
Use VISICALC or other spread-sheet programs.	15	37.5	24	60.0
Delete a program from software.	14	35.0	22	55.0

37.5 percent (15) of the entry-level employees presently were using these two competencies.

Data in Table 16 address the future use of the microcomputer software competencies and rank the competencies by frequency of favorable (yes) response. All sixteen microcomputer software competencies for entry-level employees were perceived to be needed in the future by 50 percent or more of the interviewees. All sixteen microcomputer software competencies in Table 16 show an increase in need for the future when compared to the present use shown in Table 15. Two competencies show an increase in use for the future. "Use microcomputer as word processor" had a 37.5 percent present use (as shown in Table 15), yet the data of Table 16 show a 77.5 percent future use. This indicates an increase of use by 40 percent of the agribusinesses in future years. Similarly, "use of data base management program" showed a 37.5 percent present use and a 72.5 percent future use, resulting in a 34.5 percent increase in use for future years.

Data in Table 17 show the estimated daily and weekly frequency of use for each microcomputer software competency. These are ranked by the interviewee's perceived daily use of the competency. A mean score accompanies the competency to show the number of times in that day or week the competency was performed by entry-level employees. "To maintain business records" is the leading software microcomputer competency with an average daily occurrence of 15.3 times a day. Only 52.5 percent (21) of the interviewees indicate that entry-level employees use a computer inventory program. Data in Table 17 show that "operate a computer inventory program" is used 12.7 times daily. The use of

Table 16. Future microcomputer software competencies needed for entry-level employment.

Software Competencies	Need			
	Yes		No	
	Number	Percent	Number	Percent
Retrieve and execute a program.	39	97.5	1	2.5
Locate a program using a catalog or menu.	38	95.0	1	2.5
Use software to maintain business records.	38	95.0	2	5.0
Interrupt or exit from a program.	37	92.5	3	7.5
Operate a computer accounting program.	35	87.5	3	7.5
Save and copy a program.	34	85.0	5	12.5
Operate a computer inventory program.	34	85.0	5	12.5
Properly store, transport, and handle software.	33	82.5	5	12.5
Use software developed for agricultural industry.	33	82.5	6	15.0
Use the microcomputer as a word processor.	31	77.5	8	20.0
Use a data base management program.	29	72.5	9	22.5
Properly label software.	27	67.5	8	20.0
Lock/unlock a software program.	26	65.0	13	32.5
Use VISICALC or other spread-sheet programs.	25	62.5	14	35.0
Initialize or format software.	24	60.0	12	30.0
Delete a program from software.	21	52.5	15	37.5

Table 17. Use of microcomputer software competencies for agribusiness.

Software Competencies	Frequency					
	Daily			Weekly		
	N	%	$\bar{X}$	N	%	$\bar{X}$
Retrieve and execute a program.	36	90.0	8.1	3	7.5	1.0
Locate a program using a catalog or menu.	31	77.5	10.6	4	10.0	1.8
Use software to maintain business records.	28	70.0	15.3	7	17.5	1.4
Operate a computer accounting program.	26	65.0	8.5	7	17.5	1.7
Interrupt or exit from a program.	26	65.0	7.0	6	15.0	2.1
Properly store, transport, and handle software.	26	65.0	3.4	6	15.0	1.0
Use the microcomputer as a word processor.	24	60.0	7.8	7	17.5	1.5
Save and copy a program.	22	55.0	3.6	5	12.5	1.2
Use software developed for the agricultural industry.	21	52.5	8.0	4	10.0	2.8
Operate a computer inventory program.	17	42.5	12.7	6	15.0	2.3
Lock/unlock a software program.	13	32.5	5.1	4	10.0	1.0
Use VISICALC or other spreadsheet programs.	13	32.5	2.7	7	17.5	1.4
Use a data base management.	12	30.0	4.7	7	12.5	1.5
Properly label software.	9	22.5	2.7	5	12.5	1.8
Initialize or format software.	6	15.0	2.8	6	15.0	1.8
Delete a program from software.	4	10.0	2.0	5	12.5	1.4

Table 18. Monthly and yearly use of microcomputer software competencies.

Software Competencies	Frequency					
	Monthly			Yearly		
	N	%	$\bar{X}$	N	%	$\bar{X}$
Properly label software.	12	30.0	1.3	--	--	--
Operate a computer inventory program.	9	22.5	1.2	2	5.0	3.0
Use a data base management program.	7	17.5	1.7	3	7.5	3.3
Lock/unlock a software program.	7	17.5	1.0	3	7.5	3.0
Initialize or format software.	7	17.5	1.0	5	12.5	2.4
Save and copy a program.	5	12.5	2.0	2	5.0	4.0
Interrupt or exit from a program.	5	12.5	1.2	--	--	--
Use software developed for the agricultural industry.	4	10.0	2.3	3	7.5	3.0
Delete a program from software.	4	10.0	1.0	7	17.5	1.7
Use software to maintain business records.	3	7.5	2.0	--	--	--
Use VISICALC or other spread-sheet programs	2	5.0	1.5	2	5.0	3.0
Locate a program using a catalog or menu.	2	5.0	1.5	1	2.5	1.0
Operate a computer accounting program.	2	5.0	1.5	--	--	--
Properly store, transport, and handle software.	1	2.5	1.0	1	2.5	1.0
Use the microcomputer as a word processor.	--	--	--	--	--	--
Retrieve and execute a program.	--	--	--	--	--	--

software developed for the agricultural industry was the most frequently used competency on a weekly basis. This microcomputer competency was used an average of 2.8 times per week.

Data arranged in Table 18 address the monthly and yearly frequency of use for microcomputer software competencies. "Properly label software" was the most frequent competency to be selected by interviewees for monthly usage with a 30 percent (12) response. An average use of 1.3 times a month was reported for this competency. "Deleting a program from software" was the most frequently used competency on the yearly basis. Seven (17.5 percent) of the interviewees selected this competency for yearly use. Less than 30 percent of the agribusiness representatives selected these 16 software competencies as being used monthly or yearly.

Hardware Competencies

The data in Tables 19 through 24 show how nine microcomputer hardware competencies rate when analyzed by agribusiness personnel. These nine are a part of 39 microcomputer competencies identified through research.

Data in Table 19 show the ranked importance of microcomputer hardware competencies as ranked by mean score. The data in Table 19 reveal a mean score of 4.63 (extremely important) for the hardware competency "use the keyboard" and a 4.60 mean (extremely important) for "using a printer." Hardware competency "using a disk drive" is reported to be very important ($\bar{x}$ = 3.87), while "communicate with other computers or networks" ($\bar{x}$ = 3.39), "using a telephone modem" ($\bar{x}$ = 3.03), and

"identify hardware-related problems" ($\bar{x}$ = 2.92) were reported to be important. The two lowest ranked microcomputer hardware competencies were "use a graphics tablet" ($\bar{x}$ = 1.78) and "recommend appropriate microcomputer hardware" ($\bar{x}$ = 1.67).

Table 19. Importance of microcomputer hardware competencies.

Hardware Competencies	$\bar{X}$*	SD
Use the keyboard.	4.63	0.81
Use a printer.	4.60	0.59
Use a disk drive.	3.87	1.40
Communicate with other computers or networks.	3.39	1.46
Use a telephone modem.	3.03	1.64
Identify hardware-related problems.	2.92	1.40
Properly store, transport, and assemble microcomputer hardware.	2.32	1.51
Use a graphics tablet.	1.78	1.21
Recommend appropriate microcomputer hardware.	1.67	1.10

* 5 to 4.5 = extremely important; 4.49 to 3.5 = very important; 3.49 to 2.5 = important; 2.49 to 1.5 = some importance; 1.49 to 1 = no importance.

Microcomputer hardware competencies needed by present entry-level employees are disclosed by data in Table 20. Five of the nine competencies were identified by agribusiness personnel to be presently utilized in 50 percent or more of the agribusinesses. "Use of a printer" (95 percent) and "use of a keyboard" (92.5 percent) were the two most used hardware competencies. "Use of graphic tablet" competency was needed by entry-level employment in only two agribusinesses (5 percent).

It should be noted that the data in Table 19 show "use of telephone modem" to be an important competency ($\bar{x}$ = 3.03). Data in Table 20 reveal that only 42.5 percent (17) of the interviewees indicate that entry-level employees should possess this competency.

Table 20. Microcomputer hardware competencies presently used by entry-level employment.

Hardware Competencies	Use			
	Yes		No	
	Number	Percent	Number	Percent
Use a printer.	38	95.0	2	5.0
Use the keyboard.	37	92.5	3	7.5
Use a disk drive.	28	70.0	10	25.0
Identify hardware-related problems.	27	67.5	12	30.0
Communicate with other computers or networks.	21	52.5	18	45.0
Properly store, transport, and assemble microcomputer hardware.	19	47.5	19	47.5
Use a telephone modem.	17	42.5	22	55.0
Recommend appropriate microcomputer hardware.	8	20.0	28	70.0
Use a graphics tablet.	2	5.0	37	92.5

Data in Table 21 address the future use and need of the nine microcomputer hardware competencies and rank them by frequency of "yes" responses. All hardware competencies show a constant or increased need when comparing present need (Table 20) to the future need (Table 21). All respondents (100 percent) selected "use a printer" as a competency that will be needed in the future. The author notes marked increase of

need for three of the nine hardware competencies when comparing present use with future use. "Communicate with other computers or computer networks" shows a projected increase in use by 27.5 percent (80.0-52.5) and "use of graphics tablet" will increase by 27.5 percent (32.5-5.0). The future "use of a telephone modem" showed an increase of 25.0 percent (67.5-42.5).

Table 21. Future microcomputer hardware competencies needed for entry-level employment.

Hardware Competencies	Need			
	Yes		No	
	Number	Percent	Number	Percent
Use a printer.	40	100.0	--	--
Use the keyboard.	39	97.5	1	2.5
Use a disk drive.	36	90.0	5	12.5
Communicate with other computers or networks.	32	80.0	7	17.5
Identify hardware-related problems.	29	72.5	8	20.0
Use a telephone modem.	27	67.5	12	30.0
Properly store, transport, and assemble microcomputer hardware.	19	47.5	19	47.5
use a graphics tablet.	13	32.5	26	65.0
Recommend appropriate micro-computer hardware.	12	30.0	24	60.0

Data in Table 22 show the estimated daily and weekly frequency of use for each microcomputer hardware competency. The data are ranked by the daily utilization of each competency. The two most frequently used competencies were "use a printer" (13 times daily) and "use the

keyboard" (17.9 times daily). A printer was utilized in 38 (95 percent) of the agribusinesses and the keyboard was used in 37 (92.5 percent). A disk drive was used in 26 (65 percent) of the agribusinesses on an average of 9.8 times per day. The telephone modem was used 9.2 times a day in 21 (52.5 percent) of the agribusinesses. Three (7.5 percent) interviewees indicated the need to "identify hardware-related problems" once a day. The most frequently used computer competency for weekly activities was "communicate with other computers or networks." Ten percent (4) of personnel interviewed indicated a 2.5 weekly frequency.

Table 22. Use of microcomputer hardware competencies for agribusiness.

	Frequency					
	Daily			Weekly		
Hardware Competencies	N	%	$\bar{X}$	N	%	$\bar{X}$
Use a printer.	38	95.0	13.0	2	5.0	1.0
Use the keyboard.	37	92.5	17.9	2	5.0	2.0
Use a disk drive.	26	65.0	9.8	6	15.0	1.7
Communicate with other computers or networks.	22	55.0	7.1	4	10.0	2.5
Use a telephone modem.	21	52.5	9.2	1	2.5	1.0
Properly store, transport, and assemble hardware.	5	12.5	2.2	5	12.5	1.6
Use a graphics tablet.	4	10.0	3.8	3	7.5	1.0
Identify hardware-related problems.	3	7.5	1.0	7	17.5	1.5
Recommend appropriate micro-computer hardware.	2	5.0	5.5	--	--	--

The data in Table 23 address the monthly and yearly frequency of use for microcomputer hardware competencies. These nine competencies collectively have a low number of users and frequency of use when compared to Table 22. "Identify hardware-related problems" is the most frequently used hardware competency. This competency was used in ten (25 percent) of the agribusinesses by entry-level employees for an average of 2.1 times per month, while personnel in nine (22.5 percent) agribusinesses used the competency 2.3 times per year. Nine (22.5 percent) interviewees identified "properly store, transport, and assemble hardware" as a frequent yearly activity with an average use of 2.3 times a year.

Table 23. Monthly and yearly use of microcomputer hardware competencies.

Hardware Competencies	Frequency					
	Monthly			Yearly		
	N	%	$\bar{X}$	N	%	$\bar{X}$
Identify hardware-related problems.	10	25.0	2.1	9	22.5	2.3
Recommend appropriate microcomputer hardware.	7	17.5	1.8	3	7.5	3.0
Use a telephone modem.	5	12.5	1.4	--	--	--
Communicate with other computers or networks.	5	12.5	1.2	--	--	--
Use a graphics tablet.	4	10.0	2.0	1	2.5	2.0
Use a disk drive.	1	2.5	2.0	--	--	--
Properly store, transport, and assemble hardware.	1	2.5	1.0	9	22.5	2.2
Use the keyboard.	--	--	--	--	--	--
Use a printer.	--	--	--	--	--	--

Programming Competencies

The data in Tables 24 through 28 show how nine microcomputer programming competencies rated when analyzed by agribusiness personnel. These competencies are part of 39 total microcomputer competencies that were gathered through research.

Data in Table 24 show how the respondents ranked the microcomputer programming competencies needed by entry-level employees. The nine programming competencies shown in Table 24 can be grouped into three categories, as reflected by the mean score. Important competencies would include: "clear microcomputer memory" (2.76) and "combine two programs to produce one document" (2.51). The second category is made up of five programming competencies which were considered to have some importance. The competencies were: "make small editing changes in a program" (2.47), "program mathematical functions" (2.35), "design a series of microcomputer applications relevant to work" (2.08), "list a program" (1.70), "describe programming logic" (1.59), and "develop a program using basic language" (1.53). A no-importance rating was given to the competency of "program in language other than basic" (1.15).

Microcomputer programming competencies utilized presently by entry-level employees are identified by the data in Table 25. Twenty-five (62.5 percent) of the interviewees reported that entry-level employees needed the competency, "clearing microcomputer memory." The remaining eight programming competencies are used by agribusiness personnel 35 percent or less of the time. Five percent (2) of those interviewed selected "programming in a language other than basic language" as a needed competency for entry-level employment.

Table 24. Ranked importance of microcomputer competencies for programming.

Programming Competencies	$\bar{X}$*	SD
Clear microcomputer memory.	2.76	1.42
Combine two programs to produce one document.	2.51	1.41
Make small editing changes in a program.	2.47	1.64
Program mathematical functions.	2.35	1.59
Design a series of microcomputer applications relevant to work.	2.08	1.52
List a program.	1.70	1.24
Describe programming logic.	1.59	1.07
Develop a program using basic language.	1.53	1.14
Program in a language other than "basic."	1.15	0.52

* 5 to 4.5 = extremely important; 4.49 to 3.5 = very important; 3.49 to 2.5 = important; 2.49 to 1.5 = some importance, 1.49 to 1 = no importance.

Table 25. Microcomputer programming competencies presently used by entry-level employees.

	Use			
	Yes		No	
Programming Competencies	Number	Percent	Number	Percent
Clear microcomputer memory.	25	62.5	13	32.5
Combine two programs to produce one document.	14	35.0	23	57.5
Make small editing changes in a program.	13	32.5	27	67.5
Program mathematical functions.	12	30.0	22	55.0
Design a series of microcomputer applications relevant to work.	10	25.0	25	62.5
Describe programming logic.	7	17.5	28	70.0
List a program.	4	10.0	28	70.0
Develop a program using basic language.	3	7.5	30	75.0
Program in a language other than "basic."	2	5.0	30	75.0

Data in Table 26 address the future use of the microcomputer programming competencies and rank the competencies by the frequency of "yes" responses. Three programming competencies were perceived by interviewees to be needed by 50 percent or more of future agribusiness entry-level employees. The competencies were: "clear microcomputer memory" (67.5 percent), "combine two programs to produce one document" (60 percent), and "make small editing changes in a program" (52.5 percent). Three other programming competencies were perceived by respondents to be of little value for entry-level employees. These competencies were: "describe programming logic" (22.5 percent), "develop a program using basic language" (17.5 percent), and "program in language other than basic language" (7.5 percent).

Table 26. Future microcomputer programming competencies needed for entry-level employment.

Programming Competencies	Need			
	Yes		No	
	Number	Percent	Number	Percent
Clear microcomputer memory.	27	67.5	11	27.5
Combine two programs to produce one document.	24	60.0	13	32.5
Make small editing changes in a program.	21	52.5	17	42.5
Program mathematical functions.	17	42.5	17	42.5
Design a series of microcomputer applications relevant to work.	13	32.5	22	55.0
List a program.	10	25.0	23	57.5
Describe programming logic.	9	22.5	26	65.0
Develop a program using "basic" language.	7	17.5	25	62.5
Program in a language other than "basic" language.	3	7.5	29	72.5

When comparing data in Tables 25 and 26, the author notes a slight increase in projected need for future programming competencies. The programming competency showing the largest increase when comparing present use (35 percent) to future use (60 percent) was "combining two programs to produce one document" (an increase of 25 percent).

Data in Table 27 show the estimated daily and weekly frequency of use for each microcomputer programming competency. These are ranked by the perceived daily use as reported by the agribusiness representatives. A mean score accompanies the competency to show the number of times per

Table 27. Use of microcomputer programming competencies for agribusiness.

Programming Competencies	Frequency					
	Daily			Weekly		
	N	%	$\bar{X}$	N	%	$\bar{X}$
Clear microcomputer memory.	16	40.0	3.3	4	10.0	1.5
Program mathematical functions.	5	12.5	2.6	3	7.5	1.7
Make small editing changes in a program.	7	17.5	3.0	8	20.0	1.4
Describe programming logic.	3	7.5	4.7	2	5.0	2.0
Develop a program using basic language.	2	5.0	4.0	1	2.5	1.0
List a program.	2	2.5	3.5	2	5.0	1.5
Combine two programs to produce one document.	2	5.0	1.5	3	7.5	1.3
Design a series of micro-computer applications relevant to work.	2	2.5	1.0	2	5.0	1.0
Program in a language other than "basic."	--	--	--	1	2.5	1.0

day or week the competency may be performed by entry-level employees. To "clear microcomputer memory" is the leading programming competency with an average daily use of 3.3 times a day in 40 percent of the agribusinesses. In 7.5 percent of the agribusinesses, "describe programming logic" was used an average of 4.7 times per day. "Program in a language other than basic" was not used on a daily basis.

Table 28. Monthly and yearly use of microcomputer programming competencies.

Programming Competencies	Frequency					
	Monthly			Yearly		
	N	%	$\bar{X}$	N	%	$\bar{X}$
Design a series of microcomputer applications relevant to work.	15	37.5	1.7	5	12.5	1.8
Combine two programs to produce one document.	7	17.5	1.3	4	10.0	2.5
Program mathematical functions.	5	12.5	1.2	3	7.5	3.0
Clear microcomputer memory.	5	12.5	1.0	2	5.0	2.0
Describe programming logic.	5	12.5	1.0	--	--	--
List a program.	4	10.0	1.5	2	5.0	1.5
Make small editing changes in a program.	2	5.0	1.0	3	7.5	2.7
Develop a program using basic language.	2	5.0	1.0	2	5.0	1.0
Program in a language other than "basic."	2	5.0	1.0	--	--	--

Data in Table 24 reveal the programming competency to "combine two programs to produce one document" was considered important, while data

in Table 27 show the competency has a daily use of 1.5 and a weekly use of 1.3.

Data arranged in Table 28 address the monthly and yearly frequency of use for microcomputer programming competencies. "Design a series of microcomputer applications relevant to work" was selected by 37.5 percent (15) of the interviewees as a monthly activity, while 12.5 percent (5) of the respondents reported it as a yearly activity. Two competencies were not used on a yearly basis. They were: "list a program" and "program in a language other than basic."

CHAPTER IV

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Conclusions

Based on previous data, the following conclusions have been formulated:

1. Agribusinesses who presently use microcomputers operate as corporations and deal primarily in the taxonomy area of sales and service.
2. Agribusiness respondents indicate that a high school diploma increases an employee's opportunity for entry-level employment.
3. First-year employees of agribusiness need extensive company training in microcomputer competencies because of their perceived below-average or average entry-level competencies.
4. The most important microcomputer competencies for entry-level employees are software competencies; the least important competencies for entry-level employees are programming competencies.
5. Agribusinesses are currently using computers within their businesses and indicate a need for employees to possess these competencies at entry-level in order to be competent employees. These competencies were frequently used by three-fourths of the agribusinesses and perceived to be extremely important, very important, or important for entry-level agribusiness employees:

a. Use the printer.

b. Use the keyboard.

c. Use software to maintain business records.

d. Locate a program using a catalog or menu.

e. Demonstrate a positive, non-fearful attitude towards microcomputers.

f. Retrieve and execute a program.

g. Operate a computer accounting program.

h. Demonstrate the ability to comprehend and apply operator's manual.

i. Save and copy a program.

j. Use a disk drive.

k. Properly store, transport, and handle software.

l. Operate a computer inventory program.

m. Use software developed for agricultural industry.

n. Communicate with other computers or computer networks.

o. Use the microcomputer as a word processor.

p. Describe the use of microcomputers in agricultural industry.

q. Define microcomputer terminology.

r. Describe limitations of microcomputer.

s. Interrupt or exit from a program.

6. Half of the agribusiness employees who use microcomputers daily do so one-third of the work day.

7. Entry-level employees with these nineteen microcomputer competencies, as identified by the study, are more likely to be employed by corporate agribusinesses.

Implications

From the conclusions of the study, the researcher has drawn the following implications:

1. Males may have a greater chance of full-time or part-time employment by agribusiness than do females.
2. Agribusinesses which classify themselves as corporations are more technically advanced in the use of microcomputers. Consequently, entry-level employees with computer competencies are more likely to find employment in corporations.

Recommendations

The following recommendations were revealed by this study:

1. A study should be conducted to determine the actual level of microcomputer skills high school graduates possess as they seek entry-level employment in agribusiness.
2. The results of this study should be utilized in developing microcomputer instructional material for use by Montana vocational agriculture teachers, which will lead to microcomputer competent graduates. These competencies should be articulated throughout the vocational agriculture curriculum.
3. Montana vocational agriculture teachers should utilize microcomputers whenever possible in the instructional process.
4. Production agriculture should be studied to determine common microcomputer competencies utilized by entry-level employees.

This would help establish a common core instruction for vocational agriculture students.

5. Further research should be conducted to determine if the nineteen important microcomputer competencies identified by this study are being taught to students participating in a high school curricula designed specifically to conduct instruction in computer science.

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APPENDICES

APPENDIX A

SAMPLE LETTER TO AGRIBUSINESSES AND SAMPLE SURVEY

Laurel Public Schools
SCHOOL DISTRICT NO. 7
LAUREL, MONTANA

October 10, 1984

Dear Manager:

The Vocational Agriculture Teachers of Montana need a few minutes of your time. As a profession, we teachers are vitally interested in identifying those computer skills that will be needed by our vocational agriculture high school graduates in order to be successful as entry-level employees in agribusiness. There is little doubt that the computer will serve a more important role in your agribusiness in the future. As teachers, we must know where and how the computer will be used if we are to provide the training needed by your future employees.

With your help, I plan to interview a representative group of agri-business managers throughout Yellowstone County. What I would ask you to do is give us your candid, honest opinion about the use of computers in your business. Your business has been randomly selected to be part of the sample. I hope you will be willing to give me 30 minutes of your time.

I will phone you in the near future to provide further explanation about the survey and to determine if you or a management-level person will be willing to be interviewed in your place of business at a convenient time.

Thank you for the courtesy of your assistance.

Sincerely,

Gary Schaff

Gary Schaff
Vo-Ag Instructor

SURVEY TO AGRIBUSINESSES

SAMPLE ONLY

Below is a list of expected competencies in computers for entry level employees in agribusiness. Are these expected competencies needed by your Agribusiness?

Please circle Y for USED or circle N for NOT USED to indicate if the presented competence is currently used by your employees for entry level employment.

The next column is for possible future need and use of the competence listed. Do you feel this will be an entry level competence in the future (1-5 years) for your Agribusiness? Circle Z for it being a future competence or circle X for it NOT being a future competence.

The third column is for importance of the actual competence being performed. An importance rating scale (1-5) indicates the degree of significance this has in the job being performed. Number 5 is indicative of NO importance and number 1 is indicative of EXTREME importance. What importance do these compentencies hold to the jobs performed? Circle the rating. For those not applicable, NA is to be circled.

The last column has two functions. One, the general frequence of the competency and secondly, the specific times of occurrence. Place a (D) in the slot if the competency is performed daily. Use (W) for weekly and (M) for monthly performances. Next place a number beside the letter to indicate the times performed in that time span. EXAMPLE: (5D) means daily operation done 5 times during an 8 hour work day. What frequency do these competencies for entry level employees occur in your Agribusiness?

REMEMBER: (is) (is not) for column 1 --- present use of competency
(yes) (no) for column 2 --- future use of competency
(1-2-3-4-5) for column 3 --- importance of competency
(3W) for column 4 --- frequency of competency

Space is provided for additional competencies that you feel are missing and are needed by entry level employees in your Agribusiness. Please list these competencies and rate them as well.

1. Define microcomputer terminology..... Y N Z X 1 2 3 4 5 NA _____

2. Demonstrate a positive, nonfearful attitude towards microcomputers ..... Y N Z X 1 2 3 4 5 NA _____

3. Demonstrate ability to comprehend and apply operator's manual ..... Y N Z X 1 2 3 4 5 NA _____

4. Describe the use of microcomputers in the Agricultural industry ..... Y N Z X 1 2 3 4 5 NA _____

5. Describe the limitations of microcomputers ..... Y N Z X 1 2 3 4 5 NA _____

6. Locate a program using a catalog or menu ..... Y N Z X 1 2 3 4 5 NA _____

7. Use software developed for the agricultural industry ..... Y N Z X 1 2 3 4 5 NA _____

8. Use software to maintain business records ..... Y N Z X 1 2 3 4 5 NA _____

9. Use the microcomputer as a word processor ..... Y N Z X 1 2 3 4 5 NA _____

10. The nature of this Agribusiness is ? (select one or more)
a. soleproprietor _____ d. franchise _____
b. partnership _____ e. owned _____
c. corporation _____ f. leased _____

11. The number of full time employees is: _____ male _____ female

12. The number of part time employees is: _____ male _____ female

13. The number of years the business has been operating in Yellowstone County is: _____ years

14. What is the number of computers or computer systems operated by this Agribusiness?

_____ stations.

15. When were computers first incorporated into this Agribusiness? _____ a. one year past

_____ b. two years past _____ c. three years past _____ d. four years past

APPENDIX B

COMPUTER COMPETENCE SURVEY

COMPUTER COMPETENCE SURVEY

Name of Business _____ Address _____ Phone _____

Respondent (Name) _____ Title _____ Date _____

1. **Instructions**

Below is a list of computer competencies which may be needed for entry level employees in agribusiness.

(A) Please circle **Y** if the competence is presently USED by employees, or circle **N** if it is NOT USED.

(B) The second column is to determine the future need and use of the competence listed. Circle **Z** if it is seen as being needed in the future (1-5 years) or circle **X** if it WILL NOT be needed in the future.

(C) The third column is to identify the importance of the actual competence being performed. The importance rating scale (1-5) indicates the degree of significance this has in the job being performed. Number **1** is indicative of NO importance and number **5** is indicative of EXTREME importance. Circle the number corresponding to the descriptor which best indicates the importance the competence has to the job being performed. NA is to be circled for those not applicable.

(D) The last column has two functions. One, the general frequence of competency uses and secondly, the specific times the competency is used. Place a **(D)** in the column if the competency is performed daily. Use **(W)** for weekly and **(M)** for monthly performances. Next, place a number beside the letter to indicate the times performed in that time span. EXAMPLE: (5D) means daily operation done 5 times during an 8 hour work day. What frequency do these competencies for entry level employees occur in your Agribusiness?

REMEMBER: (is) (is not) for column 1 --- present use of competency
(yes) (no) for column 2 --- future use of competency
(1-2-3-4-5) for column 3 --- importance of competency
(3W) for column 4 --- frequency of competency

At the end of this section, space is provided for additional competencies that employers may identify. Please list these competencies and rate them using the same scale as above.

FREQUENCY
(3D) Three times daily
IMPORTANCE

NA -- Not Applicable
1 -- of NO importance
2 -- of SOME importance
3 -- IMPORTANT
4 -- VERY IMPORTANT
5 -- EXTREMELY IMPORTANT

FUTURE

X -- is not a future need
Z -- is a future need

USED

N -- is not currently used
Y -- is currently used

COMPETENCIES

1. Define microcomputer terminology	Y	N	Z	X	5	4	3	2	1	NA	_____
2. Demonstrate a positive, nonfearful attitude towards microcomputers	Y	N	Z	X	5	4	3	2	1	NA	_____
3. Demonstrate ability to comprehend and apply operator's manual	Y	N	Z	X	5	4	3	2	1	NA	_____
4. Describe the use of microcomputers in the Agricultural industry	Y	N	Z	X	5	4	3	2	1	NA	_____
5. Describe the limitations of microcomputers	Y	N	Z	X	5	4	3	2	1	NA	_____
6. Locate a program using a catalog or menu	Y	N	Z	X	5	4	3	2	1	NA	_____
7. Use software developed for the agricultural industry	Y	N	Z	X	5	4	3	2	1	NA	_____

8. Use software to maintain business records	Y	N	Z	X	5	4	3	2	1	NA	_____
9. Use the microcomputer as a word processor	Y	N	Z	X	5	4	3	2	1	NA	_____
10. Retrieve and execute a program	Y	N	Z	X	5	4	3	2	1	NA	_____
11. Properly store, transport, and handle software	Y	N	Z	X	5	4	3	2	1	NA	_____
12. Save and copy a program	Y	N	Z	X	5	4	3	2	1	NA	_____
13. Use VisiCalc or other spread sheet programs	Y	N	Z	X	5	4	3	2	1	NA	_____
14. Properly label software	Y	N	Z	X	5	4	3	2	1	NA	_____
15. Make small editing changes in a program	Y	N	Z	X	5	4	3	2	1	NA	_____
16. Initialize or format software	Y	N	Z	X	5	4	3	2	1	NA	_____
17. Delete a program from software	Y	N	Z	X	5	4	3	2	1	NA	_____
18. Lock/unlock a software program	Y	N	Z	X	5	4	3	2	1	NA	_____
19. Interupt or exit from a program	Y	N	Z	X	5	4	3	2	1	NA	_____
20. Use a data base management program	Y	N	Z	X	5	4	3	2	1	NA	_____
21. Operate a computer inventory program	Y	N	Z	X	5	4	3	2	1	NA	_____
22. Operate a computer accounting program	Y	N	Z	X	5	4	3	2	1	NA	_____
23. Properly store, transport and assemble microcomputer hardware	Y	N	Z	X	5	4	3	2	1	NA	_____
24. Use the keyboard	Y	N	Z	X	5	4	3	2	1	NA	_____
25. Use a disk drive	Y	N	Z	X	5	4	3	2	1	NA	_____
26. Use a telephone modem	Y	N	Z	X	5	4	3	2	1	NA	_____

27.	Use a printer	Y	N	Z	X	5	4	3	2	1	NA	_____
28.	Use a graphics tablet	Y	N	Z	X	5	4	3	2	1	NA	_____
29.	Communicate with other computers or networks	Y	N	Z	X	5	4	3	2	1	NA	_____
30.	Recommend appropriate mcirocomputer hardware	Y	N	Z	X	5	4	3	2	1	NA	_____
31.	Identify hardware related problems	Y	N	Z	X	5	4	3	2	1	NA	_____
32.	Clear microcomputer memory	Y	N	Z	X	5	4	3	2	1	NA	_____
33.	Describe programming logic	Y	N	Z	X	5	4	3	2	1	NA	_____
34.	Develop a program using BASIC language	Y	N	Z	X	5	4	3	2	1	NA	_____
35.	Program in a language other than BASIC	Y	N	Z	X	5	4	3	2	1	NA	_____
36.	Program mathematical functions	Y	N	Z	X	5	4	3	2	1	NA	_____
37.	Combine two programs to produce one document	Y	N	Z	X	5	4	3	2	1	NA	_____
38.	Design a series of microcomputer applications relevant to work	Y	N	Z	X	5	4	3	2	1	NA	_____
39.	List a program	Y	N	Z	X	5	4	3	2	1	NA	_____

Please use the remainder of space for those competencies not listed which you feel are important for entry level employees in using computers in agribusiness. Please rank them like those above.

2. Please indicate the percent of your business which is derived from one or more of the following areas:

_____Ag. Supplies/Services:	Those businesses which provide supplies to farmers and ranchers and provide services needed to utilize these supplies.
_____Ag. Mechanics:	Businesses which sell and service agricultural power units, machinery and related equipment.
_____Ag. Products:	Businesses which assemble, sort, test, grade, store and market farm and ranch products.
_____Ag. Resources:	Businesses concerned with the principles and practices necessary to conserve and improve our natural resources.
_____Ag. Production:	Businesses involved in the production, processing, management marketing and utilization of food or feed products.
_____Ornamental Horticulture:	Businesses which produce, distribute, and utilize ornamental crops principally for ornamental or aesthetic purposes.

Entry level employment (%) requires: _____ High School Diploma _____ Associate Degree _____ Bachelor Degree

3. Of the daily operations, how many hours are spent per day per employee for live computer time? Include only those employees who use the computer on a daily basis.

(a) 1 to 2 hours _____ (b) 2 to 3 hours _____ (c) 3 to 4 hours _____ (d) more than 5 hours _____ (specify number)

4. How would you rate current computer competencies of entry level employees?

(a) Low _____ (b) Average _____ (c) Above Average _____ (d) High _____

5. Of the list below, rank which one is the most often used method of providing training in computer operations to employees for this agribusiness. Beside each rank indicate the number of hours trained for each employee, using that method of training. #6 is the least used method and #1 is the most often used method (first year term)

Training	Rank	Hours/Employee
a. company	_____	_____
b. contracted	_____	_____
c. public education	_____	_____
d. private vendor	_____	_____
e. self instruction	_____	_____

6. The nature of this Agribusiness is ? (one or more)

a. soleproprietor _____ b. partnership _____ c. corporation _____

d. franchise _____ e. owned _____ f. leased _____

7. The number of full time employees is: _____ male _____ female

8. The number of part time employees is: _____ male _____ female

9. The number of years the business has been operating in Yellowstone County is: _____ years

10. What is the number of computers or computer systems operated by this agribusiness? _____ stations

11. When were computers first incorporated into this agribusiness?

_____ a. one year past _____ b. two years past _____ c. three years past _____ d. four years and over

APPENDIX C

NAMES OF AGRIBUSINESSES PARTICIPATING IN STUDY

NAMES OF AGRIBUSINESSES PARTICIPATING
IN THE STUDY

(Billings, Montana)

Norwest Bank

Billings Nursery

Scheffelman's Landscape

Billings Rendering

Gainan's Flowers

Production Credit Association

Federal Land Bank

First Bank Billings

Federal Crop Insurance

Volley Gavert

Agri News

Monfort Food

Relmax Realty

ERA Farm and Ranch

Sylivan Nursery

Northrop King

Northern Internat'l Livestock Exposition

Yellowstone Exhibition

Great Western Sugar

Dubeau Nessan Associates

Astle Land Survey

Simplot Soil Builders

Computers, Etc.

Agro Supply

2-M Company

Farmers Insurance

Parker Livestock

Yellowstone Equipment

Mountain Supply Company

Farm and Ranch Forum

Rocky Mountain Industries

Western Ranch Supply

Cartmill, Inc.

Nye and Meyer

Coop Service Center

Case International

Wells Brothers Construction

Nash Brothers

Roscoe Steel

Yellowstone Molasses