

An Assessment of Microcomputer Utilization in Kansas Vocational Agriculture Programs

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Microcomputers have become an integral part of modern society. Not surprisingly, microcomputers are an intrinsic part of two of the most essential occupational callings in the United States--agriculture and education. The different uses of microcomputers in these two areas continue to expand as a consequence of an increase in flexibility and a decrease in price. Microcomputers may be found in the smallest rural schools as well as the largest urban schools. In these settings, vocational agriculture is one discipline taking advantage of this emerging educational technology.

Bowen (1985) commented that the roles of microcomputers in agricultural education have increasingly become more visible. Bowen further suggested that agricultural education is moving beyond the awareness and literacy stages in adopting microcomputers to the vocational agriculture classroom. As agricultural education progresses beyond the infancy stage in adopting microcomputers to the classroom, the issue arises as to where agricultural education is heading.

Previous studies have reported differing results in regards to the usage of microcomputers in vocational agriculture programs. In a study by Cepica, Stockton, Eggenberger, Dillingham, Igo, and Snodgrass (1984) of microcomputers in Texas vocational agriculture programs, 26.7% of the respondents used computers as an instructional aid. It was also reported that 42% of the respondents had access to a computer in the school and only 7.6% had a microcomputer in the agriculture department.

Brown, Townsend, and Carnes (1985) found in another Texas study that only 19.7% of the respondents used microcomputers in their vocational agriculture program. Another state study by Zidon and Luft (1987), revealed that 59.5% of North Dakota agriculture teachers used microcomputers at least once a week. Only 10.1% of the agriculture teachers in the state reported they did not use microcomputers. Zidon and Luft also reported that 72.8% had at least one computer located in the department.

In a national study of microcomputer use in vocational agriculture programs, Miller and Kotrlik (1987) reported that 39% of the respondents used a microcomputer located in their vocational agriculture department. An additional 23% of the respondents used computers located elsewhere, increasing the percentage using computers to 62%.

The heterogeneity in the findings of these studies illustrate the variation in microcomputer adoption by vocational agriculture. They indicate a continuing need for research in the area of microcomputer usage in programs of vocational agriculture on both the regional and national level.

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The role of microcomputers in agriculture and education will change rapidly as technology continues to advance. Bork (1985) asserted that computer use in education is a highly dynamic technology. He further stated that over the next 25 years computers will become the dominant delivery system in education. Microcomputers are effecting vocational agriculture programs across the country and will continue to effect them in the future. As the use of microcomputers in agricultural education continues to evolve, it is important to know the stages in the evolutionary process so strategies may be planned for future microcomputer applications.

In a study of microcomputers in Kansas vocational education, Seeber (1983) indicated there was heavy involvement on the part of Kansas vocational agriculture teachers. However, no data were available on the extent of this involvement or the present role of microcomputers in Kansas vocational agriculture programs. To plan for the changing role of microcomputers in programs of vocational agriculture in Kansas, an assessment was needed to determine their present role, as well as Kansas agriculture teachers' involvement with them. In addition, identification of factors inhibiting microcomputer use needed to be addressed to develop measures to insure the availability of this technology.

Purpose and Objectives

The purpose of this investigation was to assess the status of microcomputer usage and to measure teacher perceptions of conditions inhibiting the implementation of microcomputers in Kansas vocational agriculture programs. Specific objectives were:

1. To identify current uses of microcomputers.
2. To determine the types of hardware and software being used.
3. To identify factors that inhibit use of microcomputers.
4. To determine what microcomputer related inservice activities vocational agriculture instructors would attend.
5. To investigate the relationship between number of microcomputers in the vocational agriculture program and the years of teaching experience, the number of students enrolled in vocational agriculture, and the number of students in the high school.

Procedures

The population for this study was all of the secondary vocational agriculture programs in Kansas. The total number of programs in Kansas listed in the 1987-1988 Kansas Agricultural Education Instructors Directory was 158.

A questionnaire based on instruments developed by Cepica, et al. (1984), Brown, et al. (1985), and Zidon and Luft (1987) was developed to obtain the data needed for the study. After initial construction of the survey instrument, faculty and graduate students in agricultural education

assisted in refining items and establishing content validity. Reliability coefficients (Cronbach's alpha) of .95 were calculated for the section dealing with teacher perceptions of possible factors inhibiting micro-computer use. The questionnaire consisted of five parts: (a) demographic data; (b) computer hardware used in the vocational agriculture program; (c) software types and computer uses in the vocational agriculture program; (d) inservice activities vocational agriculture instructors would attend; and (e) teacher perceptions of possible factors inhibiting use of computers in a vocational agriculture program.

A random sample of 87 Kansas secondary vocational agriculture instructors representing 87 unique programs was selected. A sample of 87 was used to improve the randomness of the sample in case of a low return rate. The 87 instructors were sent a questionnaire and transmittal letter. Appropriate follow-up procedures (letters) were used, resulting in a response rate of 93.1%. Seventy-nine usable returns were used for data analysis giving a usable response rate of 90.9%.

The sample mean and standard deviation of years teaching experience were compared to the population mean and standard deviation. The sample mean of 11.75 with a standard deviation of 9.62 was analogous to the population mean of 11.58 with a standard deviation of 9.13, thus establishing population validity.

Results

The majority of respondents (81.01%) use computers in their vocational agriculture programs. Only two respondents (2.53%) never plan to use computers in their programs. By the year 1989, an additional 8.86% of the respondents will be using computers. Six of the seven respondents that will be using computers by 1989 already have a microcomputer in the agriculture department. The seventh respondent had not yet purchased a computer but did have access to one and had acquired software for it. Since these respondents had purchased hardware and/or software they were included with respondents presently using computers for data analysis. The remaining 7.60% of the respondents plan to start using computers sometime after 1989. Of the 71 departments that are presently using computers or will be by 1989, 66 have at least one microcomputer located in the agriculture department. The remaining five departments use or plan to use a computer located elsewhere in the school. Apple was the predominant brand of microcomputer, comprising 82.35% of the computers used by respondents. IBM and IBM compatibles accounted for the remaining 17.65%. Respondents indicated an extra disk drive (83.10%) and a dot matrix printer (83.10%) were the two most available peripherals for use in agriculture programs. A modem was also a popular peripheral being used by 31.00% of the respondents.

Table 1 shows the types of software available for respondents' vocational agriculture classes and frequency of use. Agricultural specific software (84.51%) was the most reported type of software available for vocational agriculture classes. Word processing software (67.61%) and spreadsheet software (66.20%) were the next two most often reported types of software. Integrated software (56.34%), which contains spreadsheets, word processors, and data bases was also available for the majority of respon-

dents. Additionally, agricultural specific software was also the most used type of software by respondents. Integrated software was the next type of software most frequently utilized.

Microcomputers were used to assist in all instructional areas of vocational agriculture as reported by respondents using microcomputers (Table 2). The instructional area that microcomputers were most often used to assist in instruction was the area of farm management (83.10%). Agribusiness (69.01%), animal science (66.20%), and agricultural mechanics (59.15%) were also areas where the majority of respondents reported that they used microcomputers.

Table 1
Frequency and Percent of Types of Software Available and Most Used Software Types in Vocational Agriculture Departments (N = 71)

Software type	<u>Available for use</u>		<u>Type most used</u>		
	Freq. ^a	Percent	Freq. ^b	Percent	Rank
Agricultural specific	60	84.51	20	32.79	1
Word processor	48	67.61	10	16.39	3
Spreadsheet	47	66.20	8	13.11	4
Integrated	40	56.34	19	31.15	2
Utility	39	54.93	2	3.28	5
Games	29	40.85	1	1.64	6
Database	17	23.94	0	0.00	8
Other	15	21.13	1	1.64	7

Note. ^aThe total number is greater than the number of departments because some departments had more than one type of software.

^bTen respondents did not answer the item.

Table 2
Frequency and Percent of Vocational Agriculture Instructional Areas in which Microcomputers are Used (N = 71)

Instructional Area	Freq.	Percent
Farm management	59	83.10
Agribusiness	49	69.01
Animal science	47	66.20
Agricultural mechanics	42	59.15
Leadership (F.F.A.)	35	49.30
Crops and soils	34	47.89
S.O.E.P. (Class)	19	26.76
Horticulture	18	25.35
Agricultural careers	17	23.94
Adult classes	11	15.49

Table 3 shows the management activities in which microcomputers were used. Word processing class materials (77.46%), word processing correspondence (69.01%), test generation (54.93%), and mailing lists (52.11%) were reported by a majority of respondents as management activities for which microcomputers were used.

Table 3
Frequency and Percent of Vocational Agriculture Management Activities in which Microcomputers are Used (N = 71)

Management Activity	Freq.	Percent
Word processing - class mat.	55	77.46
Word processing - correspondence	49	69.01
Test generation	39	54.93
Mailing lists	37	52.11
FFA secretary duties	34	47.89
Creating puzzles/quizzes	32	45.07
SOE record keeping	30	42.25
Word processing - other	29	40.85
FFA financial records	27	38.03
Spreadsheet for office	26	36.62
Grades management	24	33.80
Entertainment	23	32.39
SOE/FFA awards	22	30.99
Contest tabulation	9	12.68

Table 4 presents data pertaining to computer related inservice activities that respondents would attend. Even though respondents were asked to list only one choice, 19.74% of the respondents listed more than one choice.

Table 4
Frequency and Percent of Microcomputer Inservice Activities Vocational Agriculture Instructors Would Attend (N = 76)

In-service	Freq.	Percent
Using vo-ag software	25	32.89
Wish to attend more than one	15	19.74
Using spreadsheets	10	13.16
General computer literacy	6	7.89
Would not attend	6	7.89
Using integrated software	5	6.58
Using word processing	3	3.95
Beginning programming	3	3.95
Using database	2	2.63
Using modems	1	1.32
Total	76	100.00

An inservice activity dealing with agricultural specific software was the activity that most respondents (32.89%) indicated they would attend. An inservice activity dealing with spreadsheets was marked by 13.16% of the respondents. Agricultural specific software and spreadsheet software were both mentioned by all the respondents marking more than one response. Six (7.89%) of the respondents would not attend any computer related inservice activity. Only six (7.89%) marked a general computer literacy inservice activity.

Subjects were asked to respond to a series of survey items designed to assess their perceptions of possible factors that inhibit use of microcomputers in a vocational agriculture program. These data are presented in Table 5. A six-point Likert scale was used to assist respondents in describing their perceptions. Means above 3.5 were used to indicate agreement with an item; those means below 3.5 indicated disagreement with an item. Respondents strongly indicated that the lack of time by instructors to learn more about computers was the primary factor inhibiting the use of microcomputers. Respondents revealed that the lack of the following inhibited use in rank order (two through seven respectively): funding for hardware, funding for software, appropriate software, computer related pre-service, instructor's computer literacy, and knowledge of how to apply microcomputers to vocational agriculture. Respondents suggested the lack of computer related inservice and computer-based curriculum were, to a small degree, inhibiting. The least inhibiting factor was lack of support from school administration. There were no factors that respondents tended to disagree with in regards to inhibiting the use of microcomputers.

Table 5
Means and Standard Deviations of Vocational Agriculture Teachers' Perceptions of Factors Inhibiting Microcomputer Usage (N = 79)

Factor	Mean ^a	SD	Rank
Lack of instructor's time to learn	4.88	.97	1
Lack of funding for hardware	4.40	1.36	2
Lack of funding for software	4.20	1.32	3
Lack of appropriate software	4.19	1.17	4
Lack of computer related pre-service	4.15	.98	5
Lack of instructor's computer literacy	4.15	1.21	6
Lack of knowledge on how to apply computers into Vo-Ag	4.13	1.14	7
Lack of computer related inservice	3.95	1.04	8
Lack of computer based curriculum	3.81	1.14	9
Lack of appropriate hardware	3.62	1.35	10
Lack of support from administration	3.55	1.37	11

Note. ^a6 = Very strongly agree; 1 = Very strongly disagree

Correlation for Selected Demographics

Correlations between selected demographics of users and the number of computers in the agriculture department are summarized in Table 6.

Table 6

Pearson Product-Moment Correlations of Selected Demographics and Number of Computers in Agriculture Department

Department variable	Demographic variable	r
No. of computers in ag dept	Students in school ($N = 61$)	.331*
	Students in ag dept ($N = 67$)	.197
	Years teaching experience	.522*

Note. * $p < .05$.

There was a low positive correlation (.33) between the number of students in high school and the number of computers in the agriculture department. There was a moderate positive correlation (.52) between respondents' years of teaching experience and the number of computers in the agriculture department. Interpretation of the strength of the correlations was based on verbal descriptions of correlations suggested by Guilford (1956).

Conclusions

A high percentage of Kansas vocational agriculture teachers have integrated microcomputers into their vocational agriculture programs. The remainder, save for a few, plan to incorporate microcomputers in the future. By 1989, nine of ten Kansas vocational agriculture teachers will be using microcomputers to assist in instruction and management of instruction.

The popularity of Apple and IBM compatible computers among Kansas vocational agriculture teachers reflect the domination of these two companies in the commercial market. The prevalent use of Apple computers by Kansas vocational agriculture teachers may be a result of marketing and pricing strategies by Apple toward the educational market.

The percentage of modems reported in this study was higher than any percentage reported in previous studies reviewed by the writer. This finding seems to indicate a growing interest in microcomputer telecommunications and computer networks on the part of Kansas vocational agriculture teachers.

Agricultural specific software was the type of software most available to Kansas vocational agriculture teachers. In addition, agriculture specific software was the type of software that Kansas agriculture teachers employed the most. The most appropriate use of agricultural specific software was to assist instruction. The popularity of agricultural specific software suggests computer assisted instruction was the microcomputer role most utilized by Kansas agriculture teachers. The prevalent use of microcomputers in the instructional areas of farm management, agri-business, and animal science paralleled the current availability of software dealing with these areas of agriculture.

Kansas vocational agriculture teachers perceived the lack of time to learn more about computers as the major factor inhibiting computer use in Kansas

vocational agriculture programs. The lack of funding for hardware and software was also cited as a major factor inhibiting computer use.

There was a significant relationship between years of teaching experience and the number of computers in the agriculture department. Of teachers using computers the more experienced teachers tended to have a greater number of computers in the agriculture department. There are numerous explanations for this relationship. One possible explanation could be the more experienced teachers are more aware of funding sources and are more skilled at securing these funds. Another possible explanation could be experienced teachers are better established and more confident in their teaching and are better able to incorporate new technology into their programs. Possibly young teachers could be more concerned about solidifying basic teaching skills and not as able to add an additional teaching tool to their program of instruction.

Implications

Microcomputers have become a notable instructional tool in vocational agriculture programs. As a result, competency in microcomputers is becoming a prerequisite for new vocational agriculture teachers. Pre-service training in relevant microcomputer competencies should be required for certification of new teachers. Computer related inservice activities should continue to be offered for vocational agriculture teachers. These activities should be offered at times in which the greatest percentage of interested instructors would be able to attend.

The popularity of Apple and IBM compatible microcomputers among vocational agriculture teachers reflect the domination of the commercial market by these two types of microcomputers. Pre-service training and inservice training, should be conducted using these brands.

An increasing number of new and innovative computer applications for vocational agriculture will be developed as more vocational agriculture teachers utilize microcomputers in their instructional programs. Vocational agriculture teachers should be encouraged to share successful microcomputer applications with each other. Promising strategies for acquiring hardware and software should also be shared among agriculture teachers.

The use of microcomputers to assist in classroom instruction will become a standard resource as the use of microcomputers becomes prevalent in vocational agriculture. Computer based curriculum will need to be developed to supplement this new teaching tool.

The number of microcomputers in vocational agriculture departments was moderately correlated with years of teaching experience. The factors that contribute to this relationship need to be identified in order to plan strategies that would help newer teachers to obtain microcomputers for their vocational agriculture programs.

References

- Bork, A. (1985). Personal computers for education. New York: Harper and Row Publishers.
- Bowen, B. E. (1985, April). A cut above literacy: Using microcomputers in agricultural education. Agricultural Education Magazine, p. 4.
- Brown, H. D., Townsend, J. D. and Carnes J. E. (1985). Personnel training - secondary vocational agriculture teacher education. College Station: Texas A & M University, Department of Agricultural Education. (ERIC Document Reproduction Service No. ED261 252)
- Cepica, M. J., Stockton, J. Eggenberger, L., Dillingham, J., Igo C. G. and Snodgrass, T. D. (1984). Integration of computer related instruction in Texas vocational agriculture programs. Final report. Lubbock: Texas Tech University. (ERIC Document Reproduction Service No. ED 256 943).
- Guilford, J. P. (1956). Fundamental statistics in psychology and education. New York: McGraw-Hill.
- Miller, C. and Kotrlík, J. W. (1987). Microcomputer use in vocational agriculture programs in the United States. Journal of the American Association of Teacher Educators in Agriculture, 28(1), 34-30, 49.
- Seeber, S. R. (1983). Microcomputers in vocational education. Manhattan: Kansas State University, Department of Curriculum and Instruction. (ERIC Document Reproduction Service No. ED 235 306)
- Zidon, M. G. and Luft, V. D. (1987). Assessment of the use of microcomputers in North Dakota secondary vocational agriculture departments. Journal of the American Association of Teacher Educators in Agriculture, 28(1), 9-16.

Adelaine/Foster (continued from p. 16)

References

- Drueckhammer, David C. and White, James D. (1984) Considering the older adult in agriculture. The Agricultural Education Magazine, 57(5), 22-23.
- Miller, Larry E. and Krill, Thomas L. (1985) Attitudes of superintendents of Ohio comprehensive high schools toward adult programs. Journal of the American Association of Teacher Educators in Agriculture, 26(4), 2-8.
- Viterna, L. L. (1973) Opinions of school administrators concerning selected aspects of the program of vocational agriculture in Nebraska. The Agricultural Education Magazine, 45(7), 161.