

**Assessment of the Use of Microcomputers
In North Dakota Secondary Vocational Agriculture Departments**

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The number of microcomputers found in public school systems has increased dramatically over the last few years. In 1984, a market research group estimated the number of microcomputers in schools to be 550,000 (Komoski, 1984).

Malpliedl, Papritan and Lichtensteiger (1985) concluded that the availability of microcomputers in vocational agriculture departments was the exception, not the trend. They found that only 4% of the total number of computers reported in Ohio schools were located in vocational agriculture departments. Microcomputers were not found extensively in vocational agriculture departments in Illinois either. Henderson (1985) found that 32% of the 121 instructors responding to a survey had a microcomputer in the department. Of these, 54% of the microcomputers were between one and two years old. A survey by the National FFA Organization (1985) indicated that 51% of the vocational agriculture departments in the United States had computers during the 1984-85 school year. This was projected to be 65% for the following year. In the same survey, the North Dakota state supervisor for vocational agriculture reported 80% of the vocational agriculture departments had computers.

Although microcomputers have been available for use in vocational agriculture departments, not all teachers used them for instructional purposes. Of the vocational agriculture teachers surveyed in Ohio, 72% indicated they had not applied the use of microcomputers in their program (Malpliedl, et al., 1985). Of the 121 Illinois vocational agriculture teachers, 23 said they only used microcomputers for a one- to two-week period during the entire year (Henderson, 1985). Vocational agriculture teachers in New York reported using the computers more for managing instruction than for computer-assisted instruction (Sutphin, 1984). Sutphin concluded that New York agricultural educators seldom or never used computers for either computer-assisted or computer-managed instruction.

The use of microcomputers in vocational agriculture departments in North Dakota is believed to have been increasing over the past few years. Teachers of vocational agriculture were faced with the task of effectively using a relatively new teaching tool in their instructional program. The teachers have participated in classes or other inservice activities, relied on their own innovative teaching methods, taught themselves, and shared experiences with other vocational agriculture teachers to try to use the microcomputer effectively. There has been a lack of research which provides information about what successful microcomputer activities have been used in North Dakota vocational agriculture instruction.

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Purpose and Objectives

The purpose of this study was to gather information concerning the use of microcomputers by vocational agriculture teachers. Specific objectives were:

1. To determine the preparation and experiences of vocational agriculture teachers which contribute to their competence in using microcomputers.
2. To determine the extent of microcomputer hardware and software inventory available for use by vocational agriculture teachers.
3. To determine in which units of instruction microcomputers are being used by vocational agriculture teachers for instructional purposes.
4. To determine the kind of use vocational agriculture teachers and students make of the microcomputer outside the instructional program such as management of grades, test generating and correspondence.

Procedures

Population

The population of this study consisted of all secondary vocational agriculture instructors in North Dakota. The entire population of 91 teachers listed in the vocational agriculture teacher directory was surveyed.

There were nine schools where two vocational agriculture teachers worked in the same department. In these cases, the teachers were treated separately when considering microcomputer background, use of microcomputers in instructional programs and use of microcomputers for other uses. Data regarding the inventory of microcomputer hardware and software in these schools were collected from only the teacher who had been employed in the school system longer.

Two teachers in the population worked in two school systems. Because the use of microcomputers could differ from one school to another, these teachers were each treated as two individuals being employed by two school systems. Therefore, the 91 teachers consisted of 89 different individuals with two being counted twice. However, in the area of teacher microcomputer background, those two were counted only once because their background would not change from school to school.

Instrumentation

A questionnaire was developed by the researcher, graduate students and the agricultural education faculty of North Dakota State University to gather data for this study. Parts of the questionnaire were adapted from surveys developed by Church & Foster (1984) and Miller & Foster (1985). The questionnaire consisted of four parts: (a) microcomputer background of the teacher; (b) inventory of microcomputer hardware or software in the department; (c) uses for instructional purposes; and (d) for instructional management and departmental tasks.

The questionnaire was presented to the principal researcher's graduate committee for approval. It was revised as recommended by the committee and subsequently pilot tested for content validity. The questionnaire was then prepared and printed for distribution. Reliability

coefficients (Cronbach's alpha) of .81 were calculated for appropriate sections of the instrument.

Data Collection and Analysis

A cover letter, the questionnaire and self-addressed stamped envelope were mailed to each of the 91 vocational agriculture teachers. Appropriate follow-up procedures (letters and phone calls) were used, resulting in 100% return. Telephone calls and personal contacts were used to clarify data on questionnaires that were not correctly completed.

The data collected were entered on the North Dakota State University computer for analysis. Frequencies and percentages of all responses were tabulated.

Results

Background and Experience of Teachers

To determine the preparation and experiences of vocational agriculture teachers which contributed toward their competence in using microcomputers, data were gathered in four areas. The areas were: (a) years of experience; (b) type of microcomputer training; (c) frequency of current use of microcomputers by teachers; and (d) degree of comfort felt using the microcomputer.

Table 1 reveals teachers' years of experience using a microcomputer. The largest group fell into the "one but less than two years" category, representing 32 or 36% of the 89 North Dakota secondary vocational agriculture teachers. Only six teachers indicated having no experience. The use of microcomputers was relatively new; 70.8% of the teachers had less than two years' experience using them. Forty-seven teachers (52.8%) indicated they received training on the use of microcomputers through graduate level classes. Nineteen teachers had only personal experience for training; only two teachers had no training at all.

Table 1 also reveals the frequency which the teachers used a microcomputer and their degree of comfort in using it. The largest group of teachers (34.8%) indicated they use the microcomputer less than once a day but at least once a week. Twenty-two teachers (24.7%) use the microcomputer on a daily basis. Nine teachers did not use the microcomputer at all. Most teachers (51 or 58.0%) indicated they felt comfortable using microcomputers. Those feeling uncomfortable or very uncomfortable constituted 25% of the group.

Inventory of Microcomputer Hardware and Software

Apple computers were the predominate microcomputer in North Dakota vocational departments as indicated in Table 2. There were 58 departments (71.6%) with one or more Apple computers. While 22 schools did not have a microcomputer in the vocational agriculture department, all schools had microcomputers in the school. Two teachers (2.5%) indicated that microcomputers were not available for instructional use, even though their schools have them.

Decision aid programs were the most common software type used in vocational agriculture departments (Table 3). Of the 81 departments, 57 (70.4%) had this type of software; over half the departments had various other types of software. Data filing systems were found in the fewest departments (28 or 34.6%).

Table 1

Experience and Background of Vocational Agriculture Teachers in Using
Microcomputers

Variable	Number	Percent
Years of Experience:		
No experience	6	6.7
Less than one year	25	28.1
One but less than two years	32	36.0
Two to three years	19	21.4
More than three years	7	7.9
Types of Training:		
College classes	27	30.3
Graduate level classes	47	52.8
Inservice workshops	32	36.0
Personal experience only	17	19.1
No training	2	2.3
Other	3	3.4
Frequency of Use:		
At least once a day	22	24.7
Less than once a day but at least once a week	31	34.8
Less than once a week but at least once a month	11	12.4
Less than once a month but do use it sometimes	16	18.0
Do not use the microcomputer at all	9	10.1
Degree of confidence when operating:		
Very comfortable	15	17.0
Comfortable	51	58.0
Uncomfortable	18	20.5
Very uncomfortable	4	4.5

Table 2

Vocational Agriculture Departments With One or More Microcomputers

Brand of Microcomputer	n ^a	Percent
Apple	58	71.6
IBM	1	1.2
Radio Shack	2	2.5
Other	1	1.2
Departments without a microcomputer	22	27.2

^aThe total number is more than the number of schools because some departments had more than one type of microcomputer.

Table 3

Microcomputer Software in North Dakota Vocational Agriculture Departments

Type of Software	n ^a	Percent of Departments
Decision aid programs	57	70.4
Electronic spreadsheets	53	65.4
Farm analysis programs	52	64.2
Word processing programs	48	59.3
Teacher utility programs	45	55.6
Tutorial programs	43	53.1
Games	42	51.9
Data filing systems	28	34.6

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

Use of Microcomputers in Instructional Programs

To determine in which instructional units microcomputers were used, a list of units was drawn from the Course of Study Guide for Vocational Agriculture/Agribusiness in North Dakota (Luft & Backlund, 1980). Sixty of the 91 teachers reported using microcomputers in at least one instructional unit. Table 4 indicates the number of teachers who used the computer in each unit, the percent of all 91 teachers and the percent of the 60 teachers designated as users of microcomputers in their instructional program. Fifty-one teachers, or 85.0% of microcomputer users for instructional programs, used them for farm business management. This was followed by supervised occupational experience and animal nutrition, both with 32 teachers (53.3% of users) using microcomputers in these units. FFA leadership (48.3%), advanced crop science (43.3%) and small engines (40.0%) ranked next. There were six units where five or fewer teachers indicated using microcomputers.

Use of Microcomputers for Computer-Managed Instruction

A list of 15 activities was provided to determine use made of microcomputers for other than classroom instruction. The list included computer-managed instruction activities as well as other activities. Sixty of the 91 teachers reported using microcomputers in at least one area of computer-managed instruction. Table 5 shows that 40 teachers (66.7%) indicated they use word processing for making class materials, 39 (65.0%) said they use microcomputers for sending correspondence, and 36 reported using them for entertainment.

Table 4

Teachers Using Microcomputers for Teaching Instructional Units

Instructional Unit	Number of users ^a	Percent of total (n = 91)	Percent of users (n = 60)
Farm Business Management	51	56.0	85.0
SOEP (classroom)	32	35.2	53.3
Animal Nutrition	32	35.2	53.3
FFA Leadership	29	31.9	48.3
Adv/Crop Science	26	28.6	43.3
Small Engines	24	26.4	40.0
Intro/Agribusiness	22	24.2	36.7
Adv/Animal Science	21	23.1	35.0
Farm Structures	20	22.0	33.3
Basic Ag. Carpentry	20	22.0	33.3
Ag Sales & Service	19	20.9	31.7
Intro/Crop Science	18	19.8	30.0
Intro/Animal Science	14	15.4	23.3
Farm Machinery	13	14.3	21.7
Ag Electricity	12	13.2	20.0
Tractor Maintenance	12	13.2	20.0
Intro/Ag Careers	11	12.1	18.3
Soil Science	11	12.1	18.3
Ag Welding	10	11.0	16.7
Soil/Water Eng.	8	8.8	13.3
Range Management	5	5.5	8.3
Cold Metal/Solder	5	5.5	8.3
Horticulture	5	5.5	8.3
Meats Processing	3	3.3	5.0
Tractor Safety	1	1.1	1.7
Dairy Products	1	1.1	1.7

^aUsers refers to teaching using microcomputers for one or more instructional units or one or more areas of computer-managed instruction.

Conclusions

Based on the findings of this study, the following conclusions were drawn:

1. The use of microcomputers in North Dakota vocational agriculture programs was relatively new. Most teachers had less than two years' experience of using microcomputers, had received some training through college classes, graduate classes, or inservice workshops, and tended to feel comfortable or very comfortable when operating a microcomputer.

2. Nearly all North Dakota vocational agriculture teachers could have used microcomputers in their programs. Most had microcomputers within the departments; others had them available in other departments of the school.

Table 5

Teachers Using Microcomputers for Computer-Managed Instruction

Area of microcomputer use	Number of users ^a	Percent of total (n = 91)	Percent of users (n = 60)
Word processing class materials	40	44.0	66.7
Word processing correspondence	39	43.9	65.0
Entertainment	36	39.6	60.0
Test generation	34	33.0	56.7
Word processing (other)	30	33.0	50.0
Grades management	30	33.0	50.0
Spreadsheet for office use	29	31.9	48.3
SOE record keeping	28	30.8	46.7
Mailing lists	25	27.5	41.7
FFA secretarial activities	22	24.2	36.7
FFA financial activities	21	23.1	35.0
Creating quizzes and/or puzzles	20	22.0	33.3
Data base management	16	17.6	26.7
Contest tabulations	13	14.3	21.7
SOE awards	6	6.6	10.0

^aUsers refers to teaching using microcomputers for one or more instructional units or one or more areas of computer-managed instruction.

3. Microcomputers were being used in all units of instruction by one or more teachers. They were used most to work decision aid and tutorial programs in such units as farm business management, SOE, animal nutrition, FFA leadership and advanced crop science.

4. Microcomputers were often used for non-instructional purposes, most frequently for word processing, correspondence, entertainment and test generating.

Implications

1. Many teachers of vocational agriculture have been in the classroom longer than microcomputers have been available to schools. It must be recognized that these people did not have instruction on the use of computers during their undergraduate programs. It will take time to educate the teachers on the use of microcomputers and effectively using them as instructional tools.

2. Vocational agriculture teachers will tend to use microcomputers in units of instruction in which software is available. Not all software is of good quality. Teachers should be encouraged to share with each other suggestions concerning the software found to be most effective.

3. Many teachers of vocational agriculture use a microcomputer for administrative or management tasks such as word processing, correspondence or grade recording. These tasks save the teacher time which can be used for other purposes contributing to the teacher's overall effectiveness.

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