

Computer Anxiety and Other Factors Preventing Computer Use Among United States Secondary Agricultural Educators

William E. Fletcher, Agricultural Education Instructor
Baskin, Louisiana

Jacquelyn P. Deeds, Associate Professor
Mississippi State University

In 1983, the editors of *Time* deviated from their normal routine of designating a man of the year by recognizing the computer as having the greatest impact on the world. The publishers wrote, "Several human candidates might have represented 1982, but none symbolized the past year more richly, or will be viewed by history as more significant, than a machine: the computer." (Meyers, 1983).

Nowhere has the impact of the microcomputer been felt more strongly than in the schools of the United States. Bork (1985) declared that computer use in education is a highly dynamic technology and over the next 25 years will become the dominant delivery system in education. The Office of Educational Research and Improvement (1986), in the U. S. Department of Education, reported that 99 percent of all public high schools in the United States have purchased microcomputers. Data from the Second National Survey of Instructional Uses of School Computers indicate that the use of computers appears to be more common in vocational areas than in academic subjects (Survey Maps, 1986).

Sutphin (1985) stated that failure to include and use new technologies in the curriculum may jeopardize the credibility of the local agricultural education program and/or place the teacher at a disadvantage in terms of teaching effectiveness. Bowen, Miller, and Escolme (1989); Miller and Foster (1985); and Raven and Welton (1989) all wrote of the need for agricultural educators to utilize computers and urged training for those in the profession.

Several recent studies (Cantrell, 1982; Birkenholz, Stewart, & Craven, 1989; Cepica, 1984) have documented a rapid increase in the use of microcomputers in agricultural education. According to Raven and Welton (1989), microcomputers are now an intrinsic part of

agricultural education. Drueckhammer, Kotrlik, & Parton (1986) discovered that a large majority of agricultural education teachers in Louisiana who had computers failed to use them to a great extent. While a lack of training may be one reason that agricultural education teachers fail to extensively utilize computers, another reason may well be computer anxiety or fear of computers. Gephart (1982) listed three factors that might prevent teachers from using computers: (a) fear of the unknown; (b) fear of obsolescence or social problems; and (c) math anxiety.

The need for this study was based upon consideration of the following factors:

A need for agricultural education teachers to utilize computers as part of their instructional programs.

A need to determine factors which were preventing agricultural education teachers from utilizing computers as part of their instructional programs.

Conflicting information available on a nationwide basis concerning the use of microcomputers in agricultural education.

Nationwide information is not currently available on the computer anxiety level of agricultural education teachers.

Although several researchers (Bowen, 1984; Malpiedi, 1989; Miller and Foster, 1985; Zidon and Luft, 1987) have studied computer use or identified computer competencies needed by teachers on a statewide basis, few studies were found having national scope.

Purpose and Objectives

The primary purpose of this study was to determine the computer anxiety level of secondary agricultural education teachers in the United States.

Specific objectives of the study were to:

Determine the degree of computer anxiety that exists among these teachers in the United States.

Examine the proportion of the variance in the computer anxiety level of these teachers explained by selected demographic variables associated with the teachers and local programs.

Determine other factors that prohibited computer use in agriculture classrooms.

Determine the type of computer used most often in the secondary agriculture classroom.

Procedures

The population for this study included all secondary agricultural education teachers employed in public secondary schools in the United States during the 1989-1990 school year. The list of individuals in the target population was developed from the Agriculture Teachers Directory (Henry, 1989). Cochran's sample size formula (Cochran, 1977) and Dillman's (1978) suggested response rates were used to determine the sample of 224 teachers used in the study. The sample was selected using a systematic sampling technique with a random entry point.

Data collection was initiated in May, 1990, and concluded in July, 1990. The instrument for the study consisted of two parts. Part One collected information from the secondary agricultural education teachers regarding time spent by the teacher using the computer, demographic variables, and other variables related to the local agricultural education program. Part One of the instrument was an adapted version of one used by Smith and Kotrlik's (1988) in their study of Southern Region Cooperative Extension agents. A Cronbach's internal consistency reliability of .90 was obtained.

Part Two of the instrument consisted of Oetting's Computer Anxiety Scale (COMPAS), which measures level of computer anxiety. Oetting (1983) reported that the reliability for COMPAS was .96.

Procedures recommended by Dillman (1978) were used to collect the data for the study. Individual state departments of education were contacted to verify that the agriculture departments were still open and that teachers in the sample were teaching in the department of teaching in another department or were retired. Nonrespondents were contacted by telephone. Data was provided by 176 teachers for a return rate of 81.9 percent.

Findings

The age range given by 54.4 percent of the respondents was 36 and above. The most common age range was between 31 and 35. The highest degree held by 49.1 percent of the respondents was a master's degree, whereas 45.7 percent of the respondents held a bachelor's degree as their highest degree. The remainder of the respondents (5.2%) held either an educational specialist or doctoral degree. Males made up 90 percent of the respondents. The average agricultural educator had taught for approximately 13.1 years. The responses ranged from 1 to 40 years of teaching experience.

The respondents perceived themselves to be novice computer users with minimal typing skills. The average agricultural education department enrollment was reported as 84.4 students. The agricultural educators reported using the computer an average of one to three hours per week. The typical agricultural educator (36.4%) reported having an average math ability, whereas 39.2 percent reported having an above average math ability. On the average, secondary agricultural education instructors had taken one course related to microcomputers. Responses ranged from 0 to 3. Responses on typing skill ranged from "hunt and peck" to "fast," with mean response of "slow."

Research objective one sought to determine the level of computer anxiety among secondary agricultural education teachers. The Computer Anxiety Score (COMPAS) for these secondary agricultural education teachers ranged from 20 to 86, with 20 being relaxed and 86 being very anxious. The mean score was 47.3 or generally

relaxed. The summated anxiety scores of the COMPAS included 20 items. The items used on Oetting's COMPAS were statements about computers followed by two adjectives. One adjective of the pair represented little to no anxiety, whereas the other adjective represented anxiety. For example, trying to write a program in BASIC as part of a class would have the adjective pair of secure and worried. Secure would represent no anxiety, whereas worried would represent anxiety. Table 1 indicates item means ranged from 3.51 to 1.77. A one represented low to no anxiety, whereas a five represented much anxiety. One hundred and five (59.1%) of the teachers were very relaxed to generally relaxed using the computer. Mild to severe anxiety was reported by 71 (40.9%) of the respondents (Table 2).

Objective two sought to determine the amount of variance in the computer anxiety score that could be explained by demographic variables. Current level of computer skills, student proficiency in the use of computers, typing skill of the agriculture teacher, and years of teaching experience entered into the stepwise regression equation (Table 3). These four variables accounted for 53.1 percent of the variance in the COMPAS Score. Approximately 41 percent of the variance was explained by the current level of computer skills. Student proficiency in the use of the microcomputer explained 6.8 percent of the variance. An additional 3.8 percent was explained by the teacher's typing skill, whereas years of teaching experience explained 1.6 percent.

The data show that the number of courses taken related to microcomputers, use of the computer, and computer training had low negative correlations with the computer anxiety score. Teachers' perceptions that students were more proficient at the use of computers and level of computer skill were moderately correlated with the computer anxiety score (Table 4).

Objective three determined other factors as perceived by secondary agricultural education teachers that prohibited the use of the microcomputer in their agricultural education classroom (Table 5). Number of computers was the factor given by 27.8 percent of the respondents, whereas good software was given by 17 percent. Both time, money, and/or budget was rated as the next highest by 16 percent each.

Teachers' knowledge was ranked fourth by 10 percent of the respondents.

Objective four determined the type of computer used by the agriculture teachers in secondary agriculture departments. Approximately 62 percent of the respondents indicated the Apple brand of computers in use in their secondary agriculture departments, whereas 43 percent indicated that the IBM or IBM Compatible was in use. About 10 percent indicated that they still used the TRS-80. Approximately 10 percent of the respondents indicated no computers were used in their department.

Conclusions and Implications

Increasing knowledge about computers is one way to overcome computer anxiety. The more course work or knowledge a person has about the computer, the less computer anxiety is exhibited.

Data would indicate that if secondary agriculture teachers were to increase the use of the computer and their typing skills, their level of computer anxiety will likely go down.

Even though agricultural education teachers are experiencing some anxiety, it appears to be equal to the norm reported by Oetting (1983).

Mathematical ability appears not to have any effect on the computer anxiety and should not be offered as an explanation for this condition.

If secondary agricultural education teachers were supported in their use of the computer by their principal, vocational supervisor/director, superintendent, school board, state staff, teacher educators, and administrators on the local and state levels, more computers would be found in agricultural education departments.

Those teachers who have taught 10 years or fewer need instruction regarding computer usage that differs from those teachers having taught more than 10 years. Teachers having taught 10 years or fewer are more likely to be computer literate. Inservice workshops on computer applications for the intermediate and advanced user level should be designed for these teachers. The teachers having taught more than 10 years need basic computer training on the beginner and novice levels.

Table 1. COMPAS Items Descriptive Statistics

Item	Mean ^a	SD
Trying to write a program in BASIC as part of a class	3.51	1.28
Reading a book about how computers can be used	3.11	1.22
When a message appears on the screen that you have not seen before	2.94	1.05
Knowing the right words or "language" when talking about using a computer	2.92	1.26
Interpreting a complicated computer printout	2.84	1.16
Deciding which type of personal computer to buy	2.84	1.29
Explaining a problem that you have not been able to solve to a computer consultant	2.42	1.09
Taking a job where you have to regularly enter data into a computer	2.28	1.35
Computers give me more or less control	2.27	1.02
Trying to use a small computer to solve math problems	2.26	1.19
Making a mistake when entering data for analysis because of nervousness	2.24	1.25
Trying to use a small computer to balance a checkbook would usually be	2.22	1.22
Correcting an error on the screen	2.18	1.25
Trying to operate a small computer when you are all alone	2.11	1.15
Learning to keep records for a small business on a computer	1.98	1.04
Learning to use a small computer to do a budget	1.97	1.06
I generally think of computers as	1.90	.97
Just hearing the word "computer" makes me feel	1.90	.94
Looking at the keyboard of a small computer	1.90	.99
Typing on a word processor instead of a typewriter	1.77	1.08

^a1 represented no anxiety and 5 represented high anxiety

Table 2. Computer Anxiety Score

Level of Anxiety Present	Anxiety Range	F	%
Very relaxed	20-40	74	42.0
Generally Relaxed	41-50	31	17.1
Mild Anxiety	51-65	48	27.2
Anxious	66-75	15	8.6
Very Anxious	76-100	8	4.6
Total		176	100.0

Age of teacher and degree held are not factors in computer anxiety and should not be used in course application and inservice workshop planning.

More funds should be made available on the state and local levels for the purchase of microcomputers and good software for the secondary agricultural education departments.

Recommendations

Additional computer courses need to be incorporated into programs of study for students presently enrolled in teacher education programs.

Inservice training should be developed using computer tutorials to help the secondary

agricultural education teachers become comfortable with computers. These inservice training programs will decrease anxiety and increase computer competence and knowledge.

Agricultural educators should consider current level of computer skills, student proficiency in computers, typing or keyboarding skills of the secondary agricultural education teacher, and the number of years of teaching experience when designing computer courses or inservice for teachers. Inservice workshops on computer application classes should be designed for different levels of computer users (beginners, novice, intermediate, and advanced computer user levels). These demographics should be used to prepare the inservice workshops and/or computer application classes.

Table 3. Multiple Regression Analysis of Demographics to the COMPAS Score (n=176)

Source of Variation	SS	df	MS	ratio	Prob.
Regression	21323.686	4	5330.921	47.918	.0000
Residual	18801.238	169	111.249		
Total	40124.924	173	5442.170		

Variables in the equation

Variables	R	R ²	F	Prob.
Level ^a	.40981	.40981	119.430	.0000
Rule ^b	.06825	.47806	78.311	.0000
Type skill ^c	.03781	.51586	60.380	.0000
Years taught ^d	.01557	.53143	47.918	.0000

Variables not in the equation

Variables	t	Sign. t
Age	.098	.9220
Support by administrator	-1.181	.2393
Degree	-1.332	.1845
Gender	.487	.6267
Location/use of computers	-.113	.9100
Training	-.368	.7134
Courses taken	-.431	.6669
Math ability	-1.216	.2256
Factors prohibiting use	-.249	.8034

^aTeachers' level of computer skills

^bAs a rule are the students more proficient?

^cTyping skills of the agriculture teacher

^dYears of teaching experience

Agricultural educators can give support to the agriculture teachers by assisting them in writing grant proposals to purchase microcomputers and software to enhance their agriculture departments.

Administrative support needs to be strengthened. Efforts should be made to enhance the perceptions of administrative personnel toward the values of computers in secondary agricultural education.

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Table 4. Correlations between COMPAS Scores and Demographic Variables Used in Regression Analysis (n=167)

Variables	r	Strength of correlations
Age	.2381	Little, if any
Support for computer use	-.2605	Little, if any
Degree	.0005	Little, if any
Gender	-.0889	Little, if any
Years taught	.2473	Little, if any
Level of computer use	-.6440	Moderate
Computer training	-.3946	Low
Courses	-.3105	Low
Use of the computer	-.4400	Low
More proficient students	-.5404	Moderate
Math ability	-.0734	Little, if any
Factors that prohibit use	.0152	Little, if any

Note: Strength of correlation based on Hinkle, Wiersma, and Jurs (1979) Applied statistics of the behavioral sciences. Chicago: Rand McNally College Publishing.

Table 5. Factors Perceived by the Secondary Agriculture Teachers that Prohibit the Use of the Microcomputer in their Classrooms

Factors Given	Frequency ^a	Percent ^b
Number of computers	49	27.8
Good software	30	17.1
Time	28	16.0
Money/Budget	28	16.0
Teacher knowledge	18	10.2
Facilities/security	11	6.2
Equipment outdated	3	1.7
Administrative support	2	1.2
Student knowledge	1	.6

^aFrequencies add to more than 176.

^bPercentages do not add to 100 because of the number that did not give factors.

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