Computer Anxiety Levels of Virginia Extension Personnel

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Abstract
Virginia Cooperative Extension personnel were surveyed to determine their level of computer anxiety and the computer applications they used. A total of 402 persons completed Oetting's Computer Anxiety Scale and additional items. The use of step-wise regression determined that time spent using a computer, age, and years of employment were significant, but accounted for only 17% of the variance in anxiety. The results of this study provide information that will be useful to Extension educators in providing improved pre-service and in-service education for Extension personnel. These improvements can result in decreased anxiety in using computers and better service to clientele.

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Introduction

The Cooperative Extension Service has been successful in serving the needs of its clientele, and one factor contributing to this success is its willingness to change in order to meet the clientele's contemporary needs. One area of change has been the use of current technology to better serve various audiences.

An important contemporary issue for Cooperative Extension and its personnel is the use of computers. With more clients using computers to obtain information, it will be critical for agents and other field staff to gain the computer skills necessary to use computers as a means for gaining greater efficiency in obtaining and sharing educational information.

The information obtained by the study described here will be useful to Cooperative Extension administrators, state specialists, and others who deliver in-service and pre-service professional training activities to Extension personnel. These activities will enhance job performance, increase the capacity for teamwork, strengthen the learning process, and increase both agents' and staff members' ability to work with and meet the needs of diverse clientele.

With the increased use of computers by Extension personnel, it is possible that some will experience computer anxiety. Anxiety could cause personnel to limit their continued learning regarding how to use computers and new computer programs in an effective manner. This anxiety could also restrict personnel in carrying out their assignments and providing needed information to their clientele.

Smith and Kotrlik (1990) conducted a study in which they found that Extension agents experienced mild computer anxiety. They also found that the variables of computer skill level, perceived typing skills, perceived mathematical ability, and hours of computer use per week explained a substantial proportion of the variance in overall anxiety scores.

In recent years there has been a rapid addition of computers to Extension offices and an increased demand for clientele services provided via computers. Because of this, a more current study of Extension personnel's computer anxiety level was needed to provide knowledge about factors that might impede their technological learning ability. Furthermore, information obtained from this study can help to identify appropriate educational interventions that could be implemented. The results of the study will help Extension administrators and those who deliver pre-service and in-service education to improve training in computer skills.

Purpose

The purpose of this study was to determine the level of computer anxiety experienced by agents and staff in Virginia Cooperative Extension. The objectives of this study were to:

1. Determine computer anxiety levels of Virginia Cooperative Extension field personnel, consisting of agents, technicians, and secretaries;

2. Determine variance in the Extension field personnel's computer anxiety levels that could be explained by selected variables; and

3. Identify ways in which Extension personnel use computer applications.

Procedures

Instrument

Oetting's (1983) Computer Anxiety Scale (COMPAS), which was used in the Smith and Kotrlik (1990) study, is based on concept-specific anxiety. Concept-specific anxiety is associated with a specific situation, in this case computers. The primary purpose of the COMPAS instrument is to provide a general measure of computer anxiety that a person exhibits when thinking about or using a computer. The instrument contains items related to a variety of interaction situations in which people are confronted with computer uses.

Oetting's COMPAS instrument was used in this study with permission obtained from its author and a license to reproduce it. Some of the terminology in the original COMPAS instrument had become dated, and the researchers were given permission by Oetting to alter the terminology and eliminate certain subscales. A demographic section was added to obtain information about the agents and staff and their computer usage.

The long version of the COMPAS was used. It contained 40 five-point semantic-differential items, each of which had a positive side, a negative side, and a mid-point. If a score was toward the positive side, the person was comfortable in using computers. If the score was toward the negative side, the person was expressing discomfort with computers. The overall computer anxiety score ranged from 40 to 200. The ranges and classifications determined by Oetting (1985) were: 40-79, relaxed and confident; 80-104, generally relaxed and comfortable; 105-129, some mild anxiety present; 130-149, anxious and tense; and 150-200, very anxious.

Within the 40-item overall scale, there were 20 items that composed five subscales (general attitude, data entry, word processing, business operations, and computer science), each of which had four items. The original COMPAS version contained seven subscales, but for this study the hand calculator and trust subscales were eliminated. The subscales described different areas of interaction a person can have with a computer. Because each subscale contained four items, the possible range of scores was 4 to 20. The score ranges and categories for the subscales as specified by Oetting (1985) were: 4-8, very relaxed and confident; 9-10, generally relaxed and comfortable; 11-12, some mild anxiety present; 13-14, anxious and tense; and 15-20, very anxious.

Population and Sample

The population for the study consisted of the 510 Virginia Cooperative Extension field personnel who were employed at the time of the data collection. Usable responses were received from 402 Virginia Cooperative Extension personnel, a usable response rate of 79%. Included were 91 Agricultural and Natural Resources agents (ANR), 48 Family and Consumer Sciences agents (FCS), 68 4-H agents, 75 technicians, and 120 secretaries.

A field test of 24 respondents from five Cooperative Extension units was conducted before the final version was sent to the remaining Extension personnel. The purpose of this field test was to identify any necessary corrections in the wording of the directions or items on the final instrument. Analysis of field-test data indicated that no revisions were necessary.

A questionnaire package containing a cover letter, COMPAS instrument, additional items related to Extension computer use and demographics, and a stamped, self-addressed return envelope was mailed to all Virginia Extension agents and staff, excluding the field test group. The cover letter explained the purpose and instructions for completing the questionnaire. The letter stated that all responses would be kept anonymous, noting that the code appearing on the questionnaire was strictly for follow-up purposes.

Techniques listed by Isaac and Michael (1995) were used to enhance the response rate: (a) make the questionnaire objectives clear, state the importance of the instrument, make it look professional, and personalize the introduction letter; (b) send a follow-up letter to non-respondents after 10 days; and (c) place a phone call if necessary to non-respondents. Each survey was coded, mailed, and returned by mail. As the surveys were returned, the codes were matched with the master code, and the respondent's name was removed from the list of subjects. A follow-up schedule was established and followed. A 67% response rate resulted from the first mailing.

An e-mail letter was sent from the Associate Director of Virginia Cooperative Extension to all field personnel reminding them to complete the questionnaire. After this, a phone call was made to each non-respondent to remind him or her to return the questionnaire. Additional responses received after the calls and e-mail letter raised the overall response rate to 83%, and the 402 usable responses represented 79% of the population of 510.

Findings

Descriptive statistics such as means were used to report the collected data. Regression analysis using selected variables was conducted for computer anxiety.

Computer Anxiety Levels

This study found that, of the Virginia Cooperative Extension personnel, secretaries had the lowest anxiety level, with only 10.8% total for the anxious and very anxious categories. On the other hand, technicians had the highest anxiety levels, with 33.4% total in the same two categories. The personnel in the over 40 age group expressed the highest anxiety levels. The 40- to 49-year-old subjects had 22.4% total for the anxious and very anxious categories; the 50- to 59-year-old subjects had 26.8% in the same categories; while 30- to 39-year-old subjects had only 9.9%.

The summarized scores for the COMPAS and subscales are presented in Table 1. The mean score for the Extension personnel on the overall COMPAS instrument was 101.68 (SD = 31.79). Using the interpretation from the COMPAS manual, this mean is near the upper end of the generally relaxed/comfortable range. When the top two anxiety ranges are combined, only about 20% of the personnel exhibited these levels of anxiety on the overall scale. Table 1 also shows the subscale means, all of which were in the generally relaxed/comfortable or mild anxiety ranges.

Table 1
Computer Anxiety Scores for Virginia Cooperative Extension Personnel (n = 402)

Scale	M	SD	% Experiencing Anxiety[a]
Overall Computer Anxiety[b]	101.69	31.79	20.3%
Subscales[c]			
General Attitude	11.43	3.77	47.5%
Data Entry	10.98	3.80	46.0%
Word Processing	10.47	3.48	36.9%
Business Operations	9.78	3.54	29.4%
Computer Science	9.47	3.18	26.7%

[a] Percentages in this column represent the percentages of the total respondents whose scores were at least 130 on the overall scale and 13 on the subscales.
[b] Overall anxiety was computed using all 40 questions. Ranges and categories for the overall computer anxiety scale were: 40-79, very relaxed/confident; 80-104, generally relaxed/comfortable; 105-129, mild anxiety; 130-149, anxious/tense; and 150-200, very anxious (Oetting, 1985).
[c] Ranges and categories for the five subscales, each of which had four items, were: 4-8, very relaxed/confident; 9-10, generally relaxed/comfortable; 11-12, mild anxiety; 13-14, anxious/tense; and 15-20, very anxious (Oetting, 1985).

Variance in Anxiety Levels

The results of a step-wise regression analysis on the variables are presented in Table 2. The analysis was conducted using the dependent variable of computer anxiety as measured by the total of all scores recorded by respondents for the 40-item COMPAS instrument.

The table indicates that the t values for time spent using a computer, age, and years with the Extension were significant. The probabilities for these variables were all less than the alpha level of .05 established a priori. The negative t values indicate that the more education and time spent using a computer, the lower the anxiety levels. The positive t values for age and years in Extension indicate more anxiety as these variables increased. The positive t-value for gender reflects the fact that females were coded as 1 and the males as 2 and males had higher anxiety levels. The time spent using a computer explained 13% of the variance in the overall COMPAS score. Age and years with the Extension service accounted for a total of 3.5% of the variance. It would be logical that these variables would be highly inter-correlated. The remaining variables, gender and education, were not significant and accounted for less than 1% of the variance.

Table 2
Multiple Regression Analysis of Selected Variables on Computer Anxiety Scores of Virginia Cooperative Extension Personnel (n = 402)

Source of Variation	SS	Df	MS	F	Probability
Regression	59814.9	5	11963.0	15.694	.000
Residual	266028	349	762.257		
Total	325843	354			

Variables in the Equation					
Variables	R^2	F	t		Probability
Time Using the Computer	.130	55.365	-7.441		.000
Age	.024	9.649	3.106		.002
Years in Extension	.011	4.534	2.129		.034
Education	.004	1.551	-1.245		.214
Gender	.003	1.104	1.051		.294

Use of Computer Applications

The most frequently adopted computer applications were e-mail, with 89.0% use; word processing, with 88.1%; and the Internet, with 80.1% usage (Table 3). Secretaries and 4-H agents used e-mail and word processing the most. Excluding the technicians, more than 85% of each of the other personnel types used the Internet. The desktop publishing application was used by only 17.0% of the respondents. Except for presentation software, the secretaries used the applications more than other personnel. This relates to the fact that secretaries used the computer more hours per day than other personnel types. Agriculture and Natural Resources (ANR) agents used presentation software more than any other personnel type and used spreadsheet, financial, and database applications considerably more than any group except the secretaries. The Family and Consumer Sciences (FCS) and 4-H agents used e-mail and word processing more than other groups except the secretaries. The technicians used all the applications the least.

Table 3
Computer Applications Used by Virginia Cooperative Extension by Personnel Type (n = 402)

Application	Personnel Type					
	ANR (n = 91)	FCS (n = 48)	4-H (n = 68)	Technician (n = 75)	Secretary (n = 120)	Total (n = 402)
E-mail	82 90.1%	46 95.8%	66 97.0%	47 62.7%	117 97.5%	358 89.0%
Word Processing	77 84.6%	45 93.8%	65 96.6%	49 65.3%	118 98.3%	354 88.1%
Internet	79 86.8%	43 89.6%	58 85.3%	36 48.0%	106 88.3%	322 80.1%
Presentation	63 69.2%	29 60.4%	31 45.6%	9 12.0%	48 40.0%	180 44.8%
Spreadsheet	49 53.8%	11 22.9%	21 30.9%	10 13.3%	80 66.7%	171 42.5%
Financial	37 40.7%	13 27.1%	14 20.6%	3 4.0%	90 75.0%	157 39.1%
Database	22 24.2%	6 12.5%	16 23.5%	8 10.7%	65 54.2%	117 29.1%
Graphics	16 17.6%	12 25.0%	18 26.5%	13 17.3%	54 45.0%	113 28.1%
Desktop Publishing	13 14.3%	7 14.6%	13 19.1%	10 13.3%	25 20.8%	68 16.9%
Others	7 7.7%	3 6.3%	2 2.9%	6 8.0%	13 10.8%	31 7.7%

Extension personnel were also asked purposes for which they used computers (Table 4). The predominant uses for all personnel were educational materials and communications. ANR agents used computers to respond to clientele requests more than any other personnel type. They also used computerized record keeping more than any other group except secretaries.

Table 4
Purposes for Computer Use by Virginia Cooperative Extension by Personnel Type (n = 402)

| Purposes for Computer Use | Personnel Type | | | | | |
	ANR (n = 91)	FCS (n = 48)	4-H (n = 68)	Technician (n = 75)	Secretary (n = 120)	Total (n = 402)
Educational Material	83 91.2%	45 93.8%	64 94.1%	41 54.7%	110 91.7%	343 85.3%
Communications	78 85.7%	46 95.8%	64 94.1%	31 41.3%	94 78.3%	313 77.9%
Clients' Requests	72 79.1%	35 72.9%	32 47.1%	24 32.0%	77 64.2%	240 59.7%
Record Keeping	54 59.3%	21 43.8%	32 47.1%	20 26.7%	105 87.5%	232 57.7%
Others	10 11.1%	3 6.3%	8 11.8%	9 12.0%	24 20.0%	54 13.4%

Implications for Practice and Research

Considering the level of computer usage, it is advisable to continue to provide staff training for the Virginia Cooperative Extension personnel, and the same is likely to be true in other states. Computer training that is targeted to those 40 years of age and older may help alleviate their concerns. A review of position descriptions for technicians should be done to see what aspects of computer usage are required. This could facilitate additional training for the technicians related specifically to their needs, which might decrease their anxiety level.

It was indicated in this study that personnel used many computer applications, but only a few were used by the majority. It is suggested that the Extension training staff and other educators who work with pre-service and in-service Extension personnel review the applications to determine which are necessary in the daily work of various personnel categories and provide training specific to these applications.

The Extension training staff and other educators should provide personnel with training in new technologies. This can be accomplished more effectively when those providing the educational programming understand the needs of the personnel. A profile of a computer-relaxed respondent would be a younger employee who is a secretary and uses a computer more than 3 hours per day. A profile of a computer-anxious person would be a middle-aged respondent who is a technician and uses the computer fewer than 2 hours per day. The largest number of personnel used the computer to produce educational materials and to communicate with colleagues. Personnel used computers least for record keeping. Further research could determine whether this was because of a low level of need for this function or a lack of competency with record keeping software programs.

Additional research should be conducted to identify why technicians are more anxious about computer use than other personnel types. It would be useful to investigate the position requirements of technicians to determine what contributes to their higher anxiety levels. It may be that they are not provided sufficient access to a computer to develop a level of comfort through consistent use.

Additional study could identify if the needs of Extension clients related to computer usage are being addressed. There may be computer programs available to personnel that would assist the clients, but personnel may lack skills in using these programs. If so, additional training should be provided relative to specific programs. Focus groups could be held for personnel to suggest ways their positions could be improved with new computer programs or additional computer training. This study accounted for 17% of variance in computer anxiety. Additional research might identify variables that could explain the remaining variance.

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