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Attitudes of Maine Cooperative Extension Service Personnel Towards Computerization[1]

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The purpose of this study was to assess the attitudes and anxiety levels of the Maine Cooperative Extension personnel prior to receiving computer training. It was concluded that preconceptions concerning educational stereotypes play a significant role in attitudes concerning computers. No indications of computer anxiety were found.

American work patterns have changed dramatically over the past 30 years. In 1950, approximately 17 percent of the labor force was working in information-related occupations, but by 1980 this had increased to 55 percent. This increase has been brought about by advanced technology, and the development of microelectronics will continue this trend. Because of this advanced technology, we are experiencing major changes in the way we work and live.

American agriculture has also undergone many changes, having gone from hand-power to animal-power to machine-power. Today, agriculture is at the start of still another change, one that is categorized by a greater emphasis being placed on business management philosophies and techniques. Because of these changes there is a greater need for information on the farm. The ability to acquire and use information is rapidly becoming one of the keys to successfully managing today's farm. This information varies from measurements of last year's yields to monitoring next fall's futures' prices. The economic pressures currently facing agricultural producers suggest that more, not less, information will be required in the future.

The Cooperative Extension Service, functioning as an arm of the Land Grant Colleges, is charged with the mission of providing educational leadership and assistance to a wide variety of people, in an outreach type of program, that concerns itself with the practical application of knowledge, rather than its theoretical application.

Funding was obtained by the Cooperative Extension Services of Vermont, New Hampshire and Maine from the Kellogg Foundation to develop a three-year program to assist Dairy, Forestry, Poultry and Agricultural producers to take advantage of recent technological developments, especially the microcomputer. The on-going Tri-State Computer Project is designed to identify computer needs and literacy levels among Extension personnel and the client groups they serve, and to create computer training modules that can be used by Extension personnel for and with their clients.

The Maine Cooperative Extension Service (MCES) installed a microcomputer in each of the sixteen county offices and at nine UMO campus locations. These installations provided the base from which the Tri-State Computer Project was implemented. The MCES is responsible for the Dairy, Poultry, and Agricultural groups in Maine. Before the varied needs of these groups could be met, it was necessary to train the CES personnel. It soon became obvious that a traditional approach to "computer literacy" (i.e. teaching programming) would not meet the requirements of Extension personnel and allow them the opportunity to fill the requirements of the Tri-State project.

The advent of microcomputers into all aspects of our lives has created mixed reactions, to say the least, and has given rise to many claims as to their utility and effectiveness. One such claim is that a specter called "computer anxiety" interferes dramatically with attempts to teach people to use this tool effectively. Consequently a variety of special training programs designed to cope with this phenomena have been proposed. Unfortunately, there has been little success in clearly identifying the true nature and/or precursors of this "anxiety."

A survey of current literature indicated that a reliable tool to measure computer anxiety and attitudes does not yet exist. Because of the paucity of empirical literature relative to attitudes towards computers and/or computer anxiety, along with the need for developing comprehensive training courses, an attitudinal survey of CES personnel relative to computers and their use prior to their introduction in field and campus offices was initiated. The decision was made to treat Extension Personnel and their clients as two separate groups for the purposes of evaluation and training.

REVIEW OF LITERATURE

Rohner and Simonson [2] attempted to develop an index of computer anxiety by assessing a group of 175 teacher training students at Iowa State University. They described "computer anxiety" as the mixture of fear, apprehension, and hope that people feel when planning to interact, or when actually interacting, with a computer.

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After analyzing their data they concluded that they were in fact measuring "intent to use" rather than computer anxiety. They implied that "intent to use" could be defined as planning to use a computer rather than learning about using a computer. Levien, et al. [1], and Seidel and Rubin [3], indicated that one of the attitudes of people who are computer anxious, is that when given the opportunity of using or not using a computer, they often choose not to use it.

STATEMENT OF THE PROBLEM

Resistance to innovation and change has been a continual problem throughout the history of formal education, and no data exists to indicate that the attitudes of Extension personnel are any different. The main goal of this survey was to develop a reliable, valid index of computer attitude. With a reasonably valid instrument, personnel attitudes can be assessed.

To develop such an index, the term Computer Attitudes had to be operationally defined. Once defined, valid, reliable questionnaire items were developed to measure that construct [2]. Finally, an index or normative reference was established that would allow an analysis of the attitude a person had relative to the others in the group.

Additionally, this study examined the relationship of the Index of Computer Attitude (ICA) for each individual to selected demographic characteristics (sex, age, years employed, position, education, perceived math skill, present computer experience).

In summary, the purpose of this project was to:

1. Define Computer Attitude (CA).
2. Develop a Computer Attitude instrument.
3. Administer the CA instruments to subjects.
4. Calculate the Index of Computer Attitude (ICA).
5. Examine ICA by subject traits.

TABLE 1

Demographic Characteristics of Sample

	Category	N
Sex	Males	35
	Females	61
Age	18-35	29
	36-45	22
	46-55	23
	55+	22
Years Employed	1-3	31
	4-12	26
	13+	39
Position	Professional	63
	Classified	32
	Missing	01
Education	High School	35
	B.A.	12
	Graduate Degree	49

A positive Computer Attitude exists when the individual demonstrates an enthusiastic, interested, inquiring, willing-to-explore attitude; a Negative Computer Attitude can be characterized by reluctance, nervousness and general unwillingness to use the computer.

In seeking to establish a reliable Index of Computer Attitude (ICA), an instrument developed and used by Webb [4] was chosen as the preliminary instrument. It consisted of 85 questions grouped in four categories (Demographics - 7 questions, Attitude About Computers - 21 questions, Computer Usage Check-list - 31 questions, Psychological Profile - 16 questions). While Webb [4] has presented some preliminary evidence of adequate validity and reliability for the entire instrument, only the demographic and attitude sections were used in this study. During the month of June, 1983 this instrument was mailed to 100 employees of Maine Cooperative Extension Service. By August, 96 CES employees had completed and returned the instrument.

RESULTS

The 96 CES employees (35 males, 61 females) including both professionals and classified, ranged in education from high school graduates to Ph.D.'s and varied greatly in years of employment and age (See Table 1).

The composition of the work force of the Maine Cooperative Extension Service is predominantly female, quite evenly distributed in the age groups from 18 to over 55, with 31 employed 1 to 3 years and 39 over 12 years. Sixty-three respondents indicated they were in the professional category, which is composed of agents, specialists, and administrative personnel (no attempt was made to separate the three groups). The next highest group [32] is made up of classified (secretarial and aides) employees. One individual did not indicate a specific employment level. All employees are high school graduates, with 49 having a Masters degree or higher. Although this is perhaps typical of Extension services nationwide, it is atypical in regards to industry as a whole.

These demographic questions were followed by two additional statements, the first of which called for subjective assessment of the individual's skill in math (see Table 2).

The second statement was designed to access prior ex-

TABLE 2

Which statement best describes your ability in math:	N
a. I have little skill or interest in math.	7
b. I have some basic skills in math.	29
c. I have some good math skills and ability to use these skills comfortably.	38
d. I am adept in math have the ability to teach ath to elementary students.	15
e. I am very skilled in math and am able to comfortably use college math skills.	7

TABLE 3

Which statement best describes your experience with computers	N
a. I have had no experience using a computer.	25
b. I have used a computer printout or observed someone else use a computer.	20
c. I have used a computer to play a game, read information or to generate a report.	31
d. I am somewhat familiar with a computer language, can write simple programs and am comfortable interacting with computers.	19
e. I am very familiar with a wide range of computer software and hardware, can write complex programs and could earn my living with my knowledge of computers.	1

perience with computers (see Table 3).

The majority (74%) of the respondents indicated prior experience with computers (total = 71), while only 25 (26%) indicated no experience. Since no attempt was made to define what the term "computer" means, a possibility exists that computer experience may include the use of such devices as hand-held calculators, Atari type of computers, and arcade machines. Thirty-two percent (N = 31) selected response "c," which suggests that this could be a possibility. In any case, additional research should be done to determine what is meant by the term "computer." The remainder of the instrument consisted of a 26-item Attitude About Computers (AAC) scale [4]. These items utilize a 5-point Likert scale ranging from Strongly Agree to Strongly Disagree.

An Index of Computer Attitude (ICA) was computed by summing items from the 26-item AAC scale in the direction of a positive assessment of their utility and the respondents ability to use them. One-way analysis of variance (one-way ANOVA) of the Index of Computer Attitude (ICA) by sex, age, years employed, position, educational level, level of perceived math skills, and extent of prior experiences with computers were computed (see Table 4).

No significant differences in ICA by sex, age, years employed, and educational level were found. However, perceived math ability and prior computer usage were both significantly related to attitude. Higher levels of perceived math skills and more prior experience with computers both predicted a more positive attitude towards computers.

TABLE 4

Results of ANOVA of ICA Scale by Demographic, Math Ability and Computer Experience Scale

Variable	Group	N	X	SD	F	Duncan's
SEX	A. Male	33	93.4	12.3	.12	NS
	B. Female	57	92.6	10.50		
AGE	A. 18-35	29	94.7	11.6	.87	NS
	B. 36-45	20	92.5	10.5		
	C. 46-55	21	93.9	11.3		
	D. 56+	20	89.7	11.1		
YEARS EMPLOYED	A. 0-3	31	93.8	11.6	1.29	NS
	B. 4-12	24	95.0	10.6		
	C. 13+	35	90.1	11.0		
POSITION	A. Professional	58	94.1	12.0	2.19	NS
	B. Classified	51	90.4	9.2		
EDUCATION	A. High School	33	91.1	9.0	5.79	C-A
	B. B.A.	11	84.7	11.4		
	C. Graduate Degree	46	96.1	11.4		
MATH SKILLS	A. Little-Some	32	87.1	9.51	3.7	C-A, B
	B. Good	37	92.9	10.7		B-A
	C. Adept	21	101.6	8.6		
PRIOR COMPUTER USAGE	A. No Experience	25	86.0	9.5	10.05	C-A
	B. Used Printouts	20	90.0	9.8		D-A, B, C
	C. Played Games	31	93.5	10.2		
	D. Writes Programs	19	102.4	9.9		

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IMPLICATIONS

The results of this research suggest that whether one is engaged in providing on-the-job or in-service training, sales, hiring or recruitment where microcomputer usage is an important issue, one should beware of pre-conceptions based on traditional demographic models. For example, in these workers no age, sex, or job level relationships to attitudes towards computers was found. However, perceptions of ones ability in math did predict positive attitudes. This is a relationship that has important implications. It suggests some educational stereotyping which implies that the user must possess comprehensive mathematical capabilities before they can successfully use a microcomputer. There are no indications that "computer anxiety" exists.

Developers of adult education, in-service and pre-service programs at all professional levels should perhaps focus on the "myth" that one needs extraordinary math skills to use a microcomputer or that microcomputers have applications that are predominately or exclusively "math material." The finding that individuals with prior computer experience have a more positive attitude appears self-explanatory.

Further research, in similar as well as divergent work settings, of the relationships reported here is obviously required. However, these findings suggest that pre-training assessment can provide important information about potential users of microcomputers necessary for the development of effective training programs.

These findings also suggest that public school curriculum designers need to pay attention to the direction their training efforts take so as not to place an undue emphasis on a math orientation. Perhaps greater effectiveness can be achieved by educators if courses are conducted with the idea that computer literacy develops with proficiency, not math-oriented programming.

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