

Extension Agent Attitudes Toward PENpages As A Computer-Based Information Service

Deborah L. Shaffer
Blannie E. Bowen

Computer technologies are changing the way that information is disseminated to Extension agents. Yet, few researchers have examined agents' use of on-line information systems and databases. Thus, survey methodology was used to determine agents' attitudes toward, use of, and training needs relative to an on-line system, Pennsylvania's PENpages. More than 80 percent of the agents used PENpages with weekly access being the norm. The major benefit of PENpages was perceived to be quick access to current information. Agents who did not use PENpages worked primarily with the EFNEP program and had not received training.

Three eras have had profound effects upon Cooperative Extension (Dillman, 1986). In Dillman's community control era which lasted from 1914 to 1925, an Extension agent was a part of the rural community and had personal contacts with the residents. In the second era that lasted over 50 years (1926 to 1979), mass society evolved through the rapid growth of communities and the influx of individuals from various backgrounds. During this era, Extension expanded its programs to meet the needs of new audiences. Mass mailings were common and the

agent became the interpreter of information. Finally, Extension is now experiencing Dillman's third era, i.e., the information age that began in 1980. In this era, Dillman indicates that an agent is to be a "peer information consultant" and Extension, one of many sources, that clients call upon to solve their problems. As a consequence, "An [Extension] agent without ready access to a full array of information technologies in the 1990's would seem to be as handicapped as an agent without a car 50 years ago" (Dillman, 1986, p. 114). From an instructional perspective,

Deborah Shaffer is a System Project Analyst for Penn State and the ES-USDA and a member of the ACE Information Technologies SIG. Blannie Bowen is a Professor in the Department of Agricultural and Extension Education and a member of the ACE Research and Teaching/Training SIGs. A paper based on the study was presented at the 1990 ACE Research Meeting in Minneapolis.

Dillman (1986) believes an agent should teach clientele to obtain specialized information by accessing databases. In addition, the agent should interpret that information if the database is not localized.

Related Research

Some of the early online databases and information systems available to extension included AGNET (Agricultural Computing Network) which became available at the University of Nebraska in the mid-1970s, Purdue University's FACTS (Fast Agricultural Communications Terminal System), and the University of Kentucky's Green Thumb. In addition, the USDA began disseminating press releases online in 1981 (Forte, 1990). Although many online databases and information systems now exist, limited research has been conducted on factors such as perceived usefulness, efficiency, and user skills and attitudes. Several studies that addressed these factors are summarized below.

A number of factors tend to influence clients' use of online databases. Hearty and Rohrbaugh (1989) reported that completeness influenced clients to use databases, i.e. the availability of backfiles, the percentage of online information in a given subject area, and the entry of graphics and mathematical symbols. Current information such as weather and market reports encouraged agents to use the Green Thumb system (Warner & Clearfield, 1983). Dahlgren (1987) found that agricultural economists who use online bibliographic databases, as opposed to nonusers, (1) see greater future importance of online databases, (2) are more favorable toward financial support of online databases, (3) find citations more accessible electronically, and (4) are more satisfied about the usefulness of databases. Also, conveniently available computers

and modems enhance the use of databases (Dahlgren, 1987).

From an efficiency perspective, Relf et al. (1989) found that HORT, the Extension Horticulture Computer Information Directory, reduced the time that Virginia agents spent researching and preparing materials. On a weekly basis, the HORT system saved agents 720 hours and clerical workers more than 420 hours of typing and proofreading (Relf et al., 1989). The HORT system is based at Virginia Polytechnic Institute and State University.

Two studies were identified that examined how attitudes influence the use of databases. Using an online questionnaire, Noble and O'Connor (1986, p. 609) found correlations between users' negative attitudes toward technology and those who, "... are suspicious of the computer technology, find difficulty in remembering search commands, are irregular computer terminal users, and are generally in the older group." In another attitudinal study, Dimick and Marezki (1990) found that Pennsylvania Cooperative Extension agents had positive perceptions about the use of *Food for Thought*, a bi-weekly feature in PENpages, an online database. Two-thirds of the respondents felt that *Food for Thought* was very important or essential, 25% that it was somewhat important, and 8% not important.

From a behavioral perspective, Hearty and Rohrbaugh (1989) noted that most end-users are not active, eager database searchers. Typically, end-users have not been trained in online searching, thus, intermediaries do most of the searching. However, Walker (1988) found that even though end-users took twice as long as trained intermediaries to search online databases, the end-users and intermediaries were not significant

different in their precision or recall. In a related study, Dow (1988) found that the use of Pennsylvania State University's remote online Library Information Access System (LIAS) did not influence how often patrons went to the library or their attitudes toward the library. However, Dow found increased use of LIAS to verify the availability and location of materials before patrons went to the library.

As noted above, few researchers have examined extension agents' use of databases. From a technology perspective, agents tend to have positive attitudes toward the use of computers (Cantrell, 1982; Mitchell, 1985). However, questions remain about their attitudes toward, use of, and training needs relative to online databases and information systems.

The PENpages System

Computer technology is changing the way information is stored and disseminated in Pennsylvania. In 1985, a computer-based information service (PENpages) was developed by Penn State's College of Agricultural Sciences to disseminate news and research developments and to provide a reference file of educational materials for faculty and staff. Two factors influenced the establishment of PENpages. First, the state's General Assembly appropriated Pennsylvania Cooperative Extension \$1.9 million to establish a standard computer system. Funds were used to purchase a mainframe computer and to install a statewide telecommunications network. Electronic mail (PENmail) was the first service available. A complement to electronic mail and a natural progression for utilizing telecommunications capabilities was a full-text resource database, PENpages. The second factor influencing the creation of PENpages was a stipulation

in the legislative agreement that Pennsylvanians have a free public information system. Thus, PENpages was developed to serve both professionals in the College and the general public.

PENpages has experienced steady growth during its short existence. Subject matter specialists now use the system to transmit a variety of information to extension agents. In June 1990, the system contained over 6,200 documents. Over 100 subject matter experts in the College and cooperators, including the Pennsylvania Department of Agriculture and faculty at Rutgers University, enter information into PENpages. Authors can enter new information or update existing documents at any time. However, the transition from printed materials to the use of computers to obtain information via PENpages is still an adjustment for many agents.

Purpose and Research Questions

Field-based agents use various resources to find answers to clientele questions and to develop educational programs. The availability of computers and online systems such as PENpages means that agents now have another resource. However, no attempt has been made to assess the usefulness of this resource. Thus, this study was designed to determine how often PENpages is used by Pennsylvania extension agents. A secondary purpose was to determine the attitudes of agents toward their use of PENpages as a source of information. The study was guided by the following research questions:

1. How often is PENpages accessed by Pennsylvania's field-based extension agents?
2. Are there significant relationships among the agents' use of PENpages and their professional position (subject area), age, and previous computer training?

3. How do the agents use information obtained from PENpages for program development, distribution, or general knowledge and awareness?
4. What benefits do the agents perceive that they gain from using PENpages?
5. What disadvantages and limitations do the agents perceive discourage their using PENpages?
6. What do the agents' perceive would encourage their use of PENpages?

Methods and Procedures

The researchers developed a mailed questionnaire to collect the data needed to answer the above questions. Content and face validity of the questionnaire were reviewed by Penn State faculty and staff who were knowledgeable of the PENpages system. The study was also approved by the University's Office for the Protection of Human Subjects.

The population consisted of 453 county extension professionals including 4-H and youth, agricultural/natural resources, family living, and community development agents and nutrition education advisors (EFNEP) employed as of January 1, 1990. Names and addresses were obtained from the extension administration. To achieve a 5% sampling error, 210 subjects were chosen using stratified random procedures (Krejcie & Morgan, 1970).

To evaluate the questionnaire and data collection procedures, the

instrument was mailed to 35 agents who were randomly selected from the population after the sample had been drawn. Based upon the responses from 29 of these agents and comments from the College's evaluation expert, the questionnaire was modified. Cronbach's alpha reliability coefficients were computed for attitudinal items related to PENpages use, benefits and problems, and encouragement. All coefficients were of acceptable strength.

The questionnaire, a stamped, self-addressed return envelope, and a cover letter were mailed to the sample on March 14, 1990. Additional copies of these three items were mailed to the nonrespondents on March 29, 1990. A sticker stating "immediate reply requested" was placed on the front of each envelope to enhance the response rate which was 90% (189 of 210 questionnaires). However, eight questionnaires were returned uncompleted with notes that the person had retired or was on sick leave. Thus, usable questionnaires totaled 181 (86%).

Respondents who returned the questionnaire the first two weeks (early) and those who responded the last three weeks (late) were not significantly different ($p > .05$) on seven variables: PENpages training received, how often they access PENpages, years employed by Pennsylvania Cooperative Extension, and

Table 1: Relationship Between Percent of Time Respondents Worked with EFNEP and PENpages Use

Group	Time Spent with EFNEP Program				Row Totals	
	1% to 50%		More Than 50%		f	%
	f	%	f	%		
Yes - Use Myself	11	91.7	1	8.3	12	100.0
Yes - Someone Assigned	6	35.3	11	64.7	17	100.0
No Use	2	10.0	18	90.0	20	100.0
Total	19	38.8	30	61.2	49	100.0

Chi square=21.2, (2 df, $f=49$), $p < .01$, Cramer's $V=.66$

the percent of time working in agriculture/natural resources, community development, 4-H/youth, or family living. However, the early and late respondents were significantly different on three variables: their access of PENpages, educational level, and percent of time working with the EFNEP program ($p < .05$). Since those individuals who worked primarily with the EFNEP program had lower levels of education and limited access to PENpages, the findings are perhaps not applicable to these professionals.

Findings

The findings are presented according to the six research questions developed for the study.

How Often PENpages Accessed

An equal number of respondents (66 or 41.25%) personally used a computer to access PENpages or had someone assigned the task. The remainder did not use PENpages. Respondents who used PENpages tended to access the system weekly (40 or 63.5%). Those who assigned the responsibility to someone else used PENpages either weekly or monthly.

Relationships Among PENpages Use and Professional Position

The subject matter areas in which the respondents work were analyzed to detect relationships regarding the use of PENpages. The time that agents spent working in agriculture, family living, 4-H, and

community development was not related to whether or not they used PENpages themselves or assigned this responsibility to someone else in the county extension office. However, as shown in Table 1, a Cramer's V of .66 indicates a significant relationship ($p < .01$) between the time spent working with the EFNEP program and the use of PENpages. Johnson (1977) considers this relationship to be substantial. Thus, few agents who spent more than 50% of their time working with the EFNEP program used PENpages or had someone use it for them (12 of 30 agents). On the contrary, for agents who spent 50% or less of their time working with the EFNEP program, 11 used PENpages, six assigned someone to do it, and two did not use the system.

As shown in Table 2, the respondents' age was related to their use of PENpages (Cramer's V=.28, a low relationship). Younger agents tended to use PENpages themselves whereas older agents tended to assign someone else this responsibility.

A substantial relationship was found between respondents' use of PENpages and their level of education. Data presented in Table 3 show that respondents who used or assigned someone to use PENpages tended to hold either a bachelor's or a master's degree while those who did not use PENpages tended to hold

Table 2: Relationship Between PENpages Use and Respondents' Age

Age Group	PENpages Use					
	Use Myself		Someone Assigned		No Use	
	f	%	f	%	f	%
Under 26 Years	5	7.6	5	7.8	0	0.0
26-35 Years	22	33.3	13	20.3	3	12.0
36-45 Years	27	40.9	15	23.5	7	28.0
46-55 Years	9	13.6	18	28.1	6	24.0
56 and Over	3	4.6	13	20.3	9	36.0
Total	66	100.0	64	100.0	25	100.0

Chi square=24.9 (8 df, $f=155$), $p < .01$, Cramer's V=.28.

a high school diploma or an associate's degree.

The majority of the respondents (66%) had received training about using PENpages to obtain information. Data presented in Table 4 show that respondents who tended to access or assign someone to access PENpages had received training. A substantial relationship ($p < .01$) was found between use of PENpages and receiving training (Cramer's $V = .60$).

How PENpages Information Used

The respondents were asked to choose from six categories how they used information obtained from PENpages. The respondents indicated that they used the information as follows: as a professional update (129 respondents), to answer clientele questions (107 respondents), to incorporate into newsletters (102 respondents), as background information for program planning and development (87 respondents), to incorporate into newspaper articles (78 respondents), and to incorporate into radio or television programs (59 respondents).

Specialists provide numerous categories of textual resources through PENpages. Respondents were asked to rate how useful 11 resources were when provided through PENpages. A scale of 1.00-1.49 indicated not useful, 1.50-2.49

somewhat useful, 2.50-3.49 useful, and 3.5-4.00 very useful. In descending order, the most useful items were: alert notices/bulletins (mean=2.95), newsletters (mean=2.94), news articles (mean=2.55), resource catalogues (mean=2.49), national databases (mean=2.40), calendars of events (mean=2.33), journal articles (mean=2.18), research abstracts (mean=2.18), daily news updates (mean=1.94), market reports (mean=1.86), and weather data (mean=1.56).

Benefits of Using PENpages

The respondents were asked to rate the benefits observed during the past year from using PENpages as a source for information. A scale of 1.00-1.49 indicated not beneficial, 1.50-2.49 somewhat beneficial, 2.50-3.49 beneficial, and 3.50-4.00 very beneficial. The respondents found having access to new and up-to-date information (mean=3.13), being able to obtain information faster than through surface mail (mean=3.06), and the availability of a master collection of College of Agricultural Sciences information as beneficial. Respondents also found that using PENpages was beneficial because it saved them time (mean=2.71) and they received more information from specialists (mean=2.68). Items that

Table 3: Relationship Between PENpages Use and Respondents' Level of Education

Educational Level	PENpages Use					
	Use Myself		Someone Assigned		No Use	
	f	%	f	%	f	%
High School Diploma	1	1.6	10	15.4	18	75.0
Associate's Degree	0	0.0	2	3.1	3	12.5
Bachelor's Degree	27	42.2	25	38.5	1	4.2
Master's Degree	36	56.2	27	41.5	2	8.3
Doctoral Degree	0	0.0	1	1.5	0	0.0
Total	66	100.0	65	100.0	25	100.0

Chi square=77.4 (8 df, $f=153$), $p < .01$, Cramer's $V = .50$

were rated by respondents as somewhat beneficial included receiving information from external sources (mean=2.44), public clientele access (mean=2.37), and media access (mean=2.19).

Disadvantages and Limitations That Discourage PENpages Use

Respondents were asked to indicate what discouraged their use of PENpages. Answers were evaluated using the following scale: 1.00-1.49 strongly disagree, 1.50-2.49 disagree, 2.50-3.49 agree, and 3.50-4.00 strongly agree. Respondents agreed (mean=3.2) that finding time to access PENpages most discouraged their use of the system. In decreasing order of importance, other factors that limited their use of the system included not having a computer connected to PENpages (mean=2.91), the variety of information available in PENpages (mean=2.6), the amount of information available (mean=2.56), and the availability of training (mean=2.5). The respondents did not believe the PENpages system was difficult to use (mean=1.82).

Items That Encourage the Use of PENpages

Using a scale of 1=strongly encourage, 2=encourage, and 3=makes no difference, the respondents were asked what would encourage their use of the system. The respondents

indicated that having a computer on their desks would most encourage them to use PENpages (mean=1.79). Pennsylvania extension offices typically have one or two computers connected to PENpages which means that most agents must now leave their desks to use the system. In descending order, other items that would encourage their use of PENpages included new information and items in the areas of 4-H and youth development (mean=1.92), family living and EFNEP (mean=2.00), agriculture and natural resources (2.10), administration news (mean=2.21), and community development (mean=2.22). Having training on how to access and use PENpages would least encourage the respondents to use the system (mean=2.28).

Discussion and Implications

PENpages was designed as an online information delivery method for specialists to disseminate agricultural news and research developments primarily to field-based extension staff. The extent to which the agents use the system is one indicator of how well the system has been adopted. The findings reveal that equal numbers of agents access PENpages or have someone assigned the task. Fourteen respondents circled both responses because they access PENpages and also have someone assigned the task, thus, 146

Table 4: Relationship Between PENpages Use and Whether or Not Respondents' Received Training

PENpages Use	Received Training		No Training		Row Totals	
	f	%	f	%	f	%
Use Myself	58	87.9	8	12.1	66	100.0
Someone Assigned	45	69.2	20	30.8	65	100.0
No Use	2	7.1	26	92.9	28	100.0
Total	105	66.0	54	34.0	159	100.0

Chi square=57.6 (2 df, $n=153$), $p<.01$, Cramer's $V=.60$

agents (81%) use PENpages. The majority who did not use PENpages had not received training.

The majority of respondents who use PENpages access the system weekly. Agents who have someone access the system for them tended to use the system weekly or monthly. New information is entered into PENpages daily. A listing of new and updated entries is mailed to field-based staff via electronic mail once per week.

No relationships were observed between respondents' use of PENpages and their subject matter areas except for individuals who worked primarily with the EFNEP program. Those agents between the ages of 26-45 tended to use PENpages themselves and older respondents tended to have someone assigned the task or did not use the system. Additionally, those who did not use the system tended to have lower levels of education.

The second focus of this study was agents' attitudes toward the use of PENpages as a source for information. Having access to new and current information and being able to get information faster than through surface mail were perceived as beneficial by a majority of the agents. Alert notices/bulletins, newsletters, news articles, and resource catalogs were most useful when delivered via PENpages. Information obtained from PENpages was most often used by the agents as professional updates, to answer clientele questions, and in newsletters.

The agents indicated that although PENpages was easy to use, they would like to see more information on a larger variety of topics. The number one limiting factor that discouraged use was time to access the system. Respondents indicated that

having a computer on their desk connected to PENpages would encourage them to use the system.

Recommendations

Five recommendations were made based on the findings of the study.

1. EFNEP project managers should target PENpages "how to" workshops to address training needs of EFNEP advisors because training or marketing sessions have not been offered to this audience. Penn State's Department of Food Science enters a semi-weekly news column for consumers that may be a valuable resource for EFNEP Advisors.
2. Subject matter specialists should be informed that the number one use of information obtained from PENpages by staff is for personal use as professional updates.
3. The benefits of using PENpages as a source for information should be promoted among field-based agents by university faculty and administrators.
4. Efforts should focus on removing barriers that limit the use of PENpages. Ideally field-based agents should have a computer on their desks connected to PENpages.
5. Subject matter specialists should be informed that new information in all subject areas would encourage their use of PENpages as a source for information.

Questions for Further Study

1. What are subject matter specialists' attitudes toward entering information into PENpages for dissemination to agents and public clientele?
2. How can documents in PENpages that agents are using better match the resources that they indicated to be useful?

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