Designing Inservice Education for Extension Personnel: The Role of Learning Styles in Computer Training Programs

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The primary purpose of this survey research study was to identify the learning styles of Iowa State University Extension Service personnel and to investigate relationships between learning styles and opinions toward computer training and support. The population for this study was composed of all Extension personnel listed in the latest Iowa State University Extension Directory. Kolb's Learning Style Inventory (LSI) was used to assess learning styles. Kolb's LSI has a well-developed theoretical foundation, and may be the most widely used learning style inventory. Twenty-nine percent of the respondents were identified as having a converger-type learning style, 26% a diverger style, 25% an accommodator style and 20% an assimilator style. Differences occurred in preferences for training and support. No significant relationships were found among learning styles and age, gender, and professional job responsibility.

Introduction

A learning style is the unique way each individual processes information during the teaching/learning process. Using information on diverse learning styles is a relatively new consideration in the design of training programs for Extension personnel (Rollins & Yoder, 1993). Even though educators in the past decade have focused much attention on learning styles of students, the attention has been mainly on school settings. Very little attention has been

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paid to Extension settings, and little research has been done on the learning styles of Extension personnel.

Extension organizations arrange inservice education programs to keep personnel updated on content and methods. Extension inservice education typically consists of on-campus workshops at which Extension state specialists share the results of university research with county and regional Extension professionals. In the case of computer training, computer specialists provide training to a broad spectrum of personnel that includes campus and field professionals, paraprofessionals, and office personnel. Information on the preferred learning styles of Extension personnel would help in the design and implementation of computer training and support programs. As state specialists design inservice activities, they could select teaching methods suited to the preferred learning style of the majority of the potential participants.

An appropriate evaluation model to use when making decisions about inservice education for Extension personnel is Stufflebeam's CIPP model (Stufflebeam, 1971). In this model, information useful for decision-making is collected at each stage of the evaluation: context, input, process and product (Worthen & Sanders, 1987) . The context portion of the CIPP model asks: Who is our audience and what are their needs? The input question is: What will it take to meet those needs? At the process stage the question is: How are we doing? And the product-related question is: Have we met the needs? At each stage of the model, an evaluation may gather information both on the appropriate content and on the preferred educational processes.

Purpose

The primary purpose of this study was to identify and describe the learning styles of Iowa State University Extension Service personnel. It was designed to investigate relationships between learning styles and preferences for computer inservice training and support. Questions to be answered were: What are the learning styles of Extension personnel? Are there differences in learning styles related to job responsibilities? How do personnel prefer to receive computer training and support? Do differences in learning style affect preferences for computer training and support?

Theoretical Framework

Keefe (1988) defined learning styles as characteristic cognitive, affective, and physical behaviors that indicate how students

respond to the learning environment. Kolb's (1984) experiential learning theory was used as a basis for the learning styles assessed in this study. He maintained that learning consists of a cycle that includes the following four modes: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). The order in which the modes occur within the cycle and the importance of each mode depends upon the individual's learning style. For example, one person might begin learning a new computer program by experimenting with its features (the AE mode), while another person might prefer to observe how others are using it before trying it out (the RO mode).

Specific learning-style types are calculated by combining the AC-CE and AE-RO scores. Using AC-CE and AE-RO scores, we can determine a person's specific learning style as: converger, diverger, accommodator, or assimilator. Persons who have a **converger** learning style (AC-AE) are interested in finding practical uses for ideas and theories to solve specific problems; they make decisions based on finding solutions to questions or problems. Converger learners tend to choose technological careers, because they like to follow abstract conceptualization with active experimentation. **Diverger** learners (CE-RO) combine concrete experiences with reflective observation and tend to work in the arts, entertainment, and service realms. The **accommodator** learning style (CE-AE) reflects concrete experience and active experimentation. Persons with this style learn primarily from hands-on experience and tend to rely more heavily on feelings than on logical analysis when solving problems. They are most likely to do well in marketing and sales. The **assimilator** learning style (AC-RO) employs abstract conceptualization and reflective observation. Persons with this learning style are best at inductive reasoning and theory construction; they are able to assimilate observations into an integrated and logical framework and are most likely to do well in information and science careers.

Methodology

Population and Sample

The population for this study was composed of all Extension personnel listed in the 1992 Iowa State University Extension Directory (Park, 1994). The list included administrators, support staff, state specialists, field agents, paraprofessionals, and office assistants. It included personnel from Continuing Education and Extension to Business and Industry as well as Cooperative Exten-

sion. The total population numbered 974. For a population of 1,000 and a 95 percent confidence level, Salant and Dillman (1994) recommended a sample size of 198 to 278, depending upon the homogeneity of the population. For this study, the cost of the Kolb's Learning Style Inventory influenced the size of the sample, and a simple random sample of 200 was selected. Two follow-up mailings were made, and the final response rate was 95%, 184 out of 194 (six of the 200 in the original sample were no longer Extension employees). Late respondents (46) were compared to early respondents (138) on their experience and knowledge of computers, and no significant differences were found. Because of the high return rate and no differences between early and late respondents, no further effort was made to contact nonrespondents.

Instrumentation

The instrument included a commercial learning style inventory (LSI) and a researcher-generated questionnaire. Kolb's Learning Style Inventory (LSI) has a well-developed theoretical foundation (Kolb, 1984), and Carricato (1983) and McCall (1984) considered it to be the most widely used learning style inventory. The LSI questionnaire is a set of 12 sentences. Each sentence has four endings, and respondents are asked to rank order (from 4 to 1) in terms of how they would go about learning something. The four columns of sentence endings correspond to the four stages in the learning cycle (Kolb, 1985). Reliability estimates (Cronbach's alpha , reliability test) range from .73 to .88 (Rollins & Yoder, 1993).

Opinions toward computer training and support were surveyed by a researcher-generated instrument consisting of 17 questions measured by a Likert-type scale. Content validity of the instrument was established by review by three Extension computer specialists and by members of the researcher's graduate committee. Reliability was established by pilot-testing the instrument with 25 persons who were not a part of the sample. The Cronbach's alpha analysis resulted in a coefficient of .84, which is an acceptable reliability. The significance level was set at .05.

Results

Out of 184 respondents, there were 177 who fully completed the learning style inventory, and the results are displayed in Table 1. Fifty-two (29%) were identified as having a converger-type learning style; 46 (26%) a diverger style; 44 (25%) an accommodator style and 35 (20%) an assimilator style. No statistical relationships were

found among learning styles and age, gender, and professional job responsibility. The converger style was preferred by both off-campus and on-campus professional Extension staff whereas office workers preferred the diverger style (Table 1). According to Kolb (1985), persons in technical jobs tended to prefer the converger learning style, and those in the service sector tended to prefer the diverger style. When staff were distributed by main areas of responsibility, it was evident that those with agricultural responsibilities preferred the converger learning style (36%, Table 2). This finding was similar to results reported by Rollins and Yoder, who reported 32 percent of agriculturists as convergers (1993). However, their study found that home economics professionals tended to prefer the accommodator learning style. In this study, those in community development, home economics, engineering, and agriculture all preferred the converger style (Table 2).

Table 1:

Distribution of Extension Personnel by Merged Job Position and Learning Style (n=177)

Job Position	Converger		Diverger		Accommodator		Assimilator		Chi-Square	Degree of Freedom
	N	%	N	%	N	%	N	%		
On-campus (n=73)	24	33%	13	18%	24	33%	12	16%	13.47*	6
Off-campus staff (n=58)	20	34%	17	29%	12	21%	9	16%		
Office workers (n=46)	8	17%	16	35%	8	17%	14	30%		
Total	52	29%	46	26%	44	25%	35	20%		

*p < .05

The participants were asked to respond to 11 items relating to their preferences for specific ways of receiving computer training and support. When grouped by learning style, there were significant differences at the .05 level for tutorial computer disks and satellite training (Table 3). Those with a divergent learning style were more likely than those with a convergent style to agree that they liked to receive training and support via computer disks.

Table 2

Distribution of Extension Personnel by Main Area of Responsibility and Learning Style (n=177)

Job	Converger		Diverger		Accommodator		Assimilator	
Responsibility	N	%	N	%	N	%	N	%
Agriculture (n=33)	12	36%	7	21%	7	21%	7	21%
Home economics (n=21)	8	38%	3	14%	6	29%	4	19%
Youth (n=24)	7	29%	7	29%	8	33%	2	8%
Community development (n=7)	3	43%	2	28%	2	29%	0	0%
Engineering (n=8)	3	38%	4	50%	0	0%	1	13%
Education (n=12)	3	25%	4	33%	3	25%	2	17%
Administration (n=14)	3	21%	3	21%	3	21%	5	36%
Office workers (n=46)	8	17%	16	35%	8	17%	14	30%
Other (n=12)	5	42%	0	0%	7	58%	0	0.0%
Total	52	29%	46	26%	44	25%	35	20%

Those with an accommodator learning style were more likely than those with a convergent style to like satellite delivery of computer training. There were no significant differences due to learning style for computer assistance needed (Table 4) or for computer knowledge (Table 5).

As might be expected, respondents agreed that they wanted their support personalized, but an interesting finding in Table 3 was the strong support for a user-friendly manual. The combination of a manual, video, and computer disk also received high ratings.

Findings in Tables 4 and 5 indicate on which computer-related topics Extension personnel were knowledgeable and on which topics they still needed assistance. According to these findings, Extension personnel did not need a basic introduction to computers. They were more likely to need help with specific software programs.

Table 3

Analysis of Variance of Means of Respondents' Preferences to Receive Training and Support by Learning Style (n=177)

Way to receive training and support	Converger (n=52)	Diverger (n=46)	Accommodator (n=44)	Assimilator (n=35)	F-Value
Personalized	4.42	4.30	4.34	4.22	1.87
Telephone	3.37	3.16	3.41	3.11	0.88
On-campus	3.52	3.69	3.17	3.42	1.63
Periodical newsletter	3.35	3.27	3.37	3.14	0.39
Tutorial computer disks	3.08_a	3.62_b	3.50_{ab}	3.18_{ab}	4.09**
Video tapes	2.85	3.20	3.24	3.08	1.73
Via EXNET	2.60	3.02	2.93	2.64	1.74
Program documentation	3.27	3.44	3.15	2.89	2.28
Satellite	2.50_a	2.96_{ab}	3.22_b	2.75_{ab}	5.39**
User-friendly manual	4.10	3.74	3.80	3.61	2.23
Combination of manual, video, and computer disk	3.60	3.78	3.83	3.50	1.19

Note: Values represent agreement with "I like to receive training and support in the following ways."
Scale: 1=Strongly disagree; 2=Disagree; 3=Undecided; 4=Agree; 5=Strongly agree.
Means in the same row that do not share subscripts differ significantly at $p < .01$
**$p < .01$\

Educational Importance and Recommendations

Increased computer competency of Extension personnel is needed as clientele become more computer literate (Taylor, Hoag, & Owen, 1991). Identification of learning styles of Extension personnel is important, because the information can be used in several ways in a training setting. In the design of training programs, state specialists will use the teaching methods most suited to the preferred learning style of the majority of the potential

Table 4

Analysis of Variance of Means of Needed Assistance by Learning Style (n=177)

Needed assistance	Converger (n=52)	Diverger (n=46)	Accommodator (n=44)	Assimilator (n=35)	F-Value*
Basic introduction to computers	1.79	1.87	1.98	1.89	0.24
Specific software programs	3.90	3.91	3.89	3.64	0.88
Computer programming	3.10	3.22	2.96	3.17	0.38
Information retrieval and exchange (EXNET)	3.00	2.80	2.80	2.97	0.32
Purchasing new equipment	3.02	2.87	2.89	2.67	0.56
Upgrading software	3.48	3.36	3.33	3.06	1.03

Note: Values represent agreement with need for assistance. Scale: 1=Strongly disagree; 2=Disagree; 3=Undecided; 4=Agree; 5=Strongly agree.

*No values were significantly different at $p < .05$.

participants. Individuals whose preferred styles differ from the norm can be identified and given special attention. Because the professional staff tended toward the converger style of learning, computer training for them should include the presentation of concepts and then the opportunity for them to experiment with what has been presented.

Because the office assistants and secretaries tended to prefer the diverger styles of learning, their computer training should start with hands-on situations and then provide an opportunity for them to share with each other what they have done, thereby reflecting on what they have learned. There was no group in this study in which there was a majority preference for a learning style. The results indicated that it is important to use a variety of teaching methods in training in order to connect with a wide spread of preferred learning styles.

Table 5

Analysis of Variance of Means of Computer Knowledge Items by Learning Style (n=177)

Item	Converger (n=52)	Diverger (n=46)	Accommodator (n=35)	Assimilator (n=44)	F-Value*
System	3.44	3.43	3.22	3.50	.65
Word	3.96	3.98	3.87	3.94	.15
Spreadsheet	3.08	2.83	2.80	3.03	.78
Graphics	2.54	2.48	2.46	2.83	.80
Statistical	2.33	2.33	2.09	2.69	1.98
Communication	3.29	3.09	3.11	3.19	.34
Language	2.08	2.50	2.41	2.53	1.81

Note: Values represent agreement with need for assistance. Scale: 1=Strongly disagree; 2=Disagree; 3=Undecided; 4=Agree; 5=Strongly agree.

*No values were significantly different at $p < .05$.

Future research is needed on how learning styles are related to other measures, such as inventories of personality types or leadership styles. The stability of learning style and the possibility that different topics may invoke different learning styles should be studied. Motivation may play a large role in learning styles, and the relationship of motivation to learning style is an important topic for future research.

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