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## Distance Education: Perceived Barriers and Opportunities Related to Extension Program Delivery

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## Distance Education: Perceived Barriers and Opportunities Related to Extension Program Delivery

### Abstract

A Delphi study was conducted to determine obstacles, advantages, and potential topics that could be developed related to distance education as perceived by Extension educators. Respondents suggested that clientele connectivity, clientele lack of technology, and lack of competencies associated with technologies were major obstacles for distance education utilization. Respondents identified savings in travel time and travel expenses, reaching new audiences, and opportunities for multiple delivery systems as major advantages of distance education. Respondents said programs focused on lawn, ornamental, household gardening; general horticulture; and pesticide usage were highly valued and could be successful with clientele.

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## Introduction & Theoretical Framework

As Extension begins to develop educational program delivery strategies that include distance education, one of the most challenging aspects is to establish a culture among county Extension educators to integrate this educational program delivery strategy into ongoing programming to ensure added value to program delivery strategies. County Extension educators could view this educational strategy as a competitor to traditional program delivery efforts, fearing that the lack of interaction with the learner will lead to less effective learning experiences, and learner connectivity could potentially affect the quality of educational programs in the future.

Campbell (1995) notes that "higher education [including Extension education] faces the challenge of expanding the reach, quality, and effectiveness of instruction within the context of shrinking resources as well as organizing itself to serve students [Extension clientele] regardless of where they reside" (p.73). As Extension faces these challenges, distance education becomes paramount to the effectiveness and the accessibility to Extension programs.

The theoretical underpinning for the study reported here is Rogers' diffusion of innovation literature. Distance education is like any other innovation. Rogers (2003) defined an innovation as "an idea, practice, or object perceived as new by an individual or other unit of adoption" (p. 34). The characteristics or attributes of distance education that affect the rate of adoption are relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003).

The primary audience that must adopt or reject distance education initially is county Extension educators. The adoption or rejection of this innovation largely depends upon the attributes of the innovation itself and the characteristics of the county Extension educators that must adopt this

innovation as an element of Extension educational delivery. Murphrey and Dooley (2000) stated that "how people perceive and react to these technologies is far more important than the technical obstacles in influencing implementation and use" (p. 40). Therefore, the study focused on the perception of Extension educators as it relates to the adoption of distance education in Extension educational program delivery.

## Purpose and Research Questions

The purpose of the study was to determine what Extension educators perceive as advantages and obstacles associated with implementing distance educational strategies in Extension District 11. Four research questions were developed to guide the study:

- **Research Question 1:** What are the perceived obstacles related to utilizing distance education?
- **Research Question 2:** What are the perceived advantages associated with distance education?
- **Research Question 3:** What subject matter topics do Extension educators perceive to have the highest value in terms of being delivered through distance education?
- **Research Question 4:** What subject matter topics do Extension educators perceive clientele will be most receptive to learning at a distance?

## Methodology

A Delphi research technique was used in the descriptive research design. Linstone and Turoff (1975, p.3) define Delphi as "a method of structuring a group communication process, so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem." The Delphi technique uses experts to predict change in a more qualitative sense versus a quantitative sense (Kaynak, Bloom, & Leibold, 1994). A Delphi technique allows for the exploration of creative ideas revealing highly reliable data that can be used for decision making (Rowe & Wright, 1999).

The Delphi technique is designed for the systematic solicitation of expert opinion and involves anonymous forecasts made on two or more rounds by a panel of experts. These individuals receive feedback between each round. As initial responses are made separately, new ideas are highlighted which other participants may not have previously considered. Responses obtained from the participants are then collated and fed back to respondents in a more specific form. The respondents are then asked to provide a more specific response if their first statement is not clear or is too general. The objective of each round is to gradually work toward a consensus among the participants that forms the basis of or outline of the major objectives that need to be addressed.

Round one contains a number of open-ended questions. Round 2 and subsequent rounds typically involve more closed questions that use Likert-scaling techniques to help quantify and prioritize the most important objectives. The Delphi for this study involved three rounds, so steps 3-5 were repeated once.

Round one was initiated in November 2003 by identifying participants, who included 51 district-based Extension educators in Extension District 11 who were e-mailed the four following open-ended questions.

- Please list the perceived obstacles you envision in utilizing distance technology in program delivery.
- Please list advantages that you would perceive regarding the use of distance technology in program delivery.
- Please list web based modules that you would like to see developed to strengthen county educational programs.
- Please list some disadvantages that you would perceive regarding the use of distance technology.

These questions were sent electronically two times in following Dillman's Technique (2000). Round one resulted in a total of 43 responses (84.3% response rate). The responses to this initial survey were compiled, and the results were used to develop a more specific Likert survey used to measure county- and district-based educators' perceptions related to distance educational program delivery. The open-ended responses were analyzed and coded using qualitative research methodology outlined by Dooley and Murphy (2001).

Round two used a Likert scale survey in December 2003 to prioritize and rank the listing responses identified in round 1. Procedures outlined by Dillman (2000) were used for electronic mailing and data collection. This included one follow-up notification to participants who had not responded. Round 2 data were analyzed using SPSS 11.0 for Windows software. Descriptive statistics were used to summarize data.

# Results

## Audience Description

The 51 county- and district-based educators who were surveyed in the study consisted of county Extension agents, district-based subject matter specialists, Extension associates, and Extension program managers. A total of 43 county- and district-based educators responded (84.3% response rate), consisting of 56% male and 44% females. Those responding by professional responsibility consisted of 17 Agriculture and Natural Resources county Extension agents, 12 Family and Consumer Sciences county Extension agents, 1 Marine county Extension agent, 1 Natural Resources county Extension agent, 1 Family Consumer Science 1890 program Extension agent, 5 district-based subject matter specialists, 1 Extension associate, 1 Extension program manager, and 4 4-H and Youth Development county Extension agents .

In terms of age, 35% were 30 years of age or less, 16% were 31 to 40 years of age, 19% were 41 to 50 years of age, and 30% were over 50 years of age. 16 of the respondents (37%) held bachelor's degrees, with five having taken courses toward a master's degree; 22 of the respondents(51%) held master's degrees, with three having taken courses toward a Ph.D. or doctorate; and 5 (12%) held a Ph.D. or doctorate.

## Research Question 1

Table 1 shows that of the perceptions of Extension educators related to six statements dealing with concerns/obstacles associated with distance education, Extension educators are most agreeable that connectivity problems from their clients' homes is a concern/obstacle (M= 4.14, SD = .83), clientele do not have computers/technology to learn at a distance (M=3.84, SD= .97), and clientele do not have competencies associated with technology to access programs delivered at a distance (M=3.44, SD= 1.10). Likert scale was defined as: 1= Strongly Disagree, 2= Disagree, 3= No Opinion, 4= Agree, and 5= Strongly Agree.

In addition, Table 1 notes that Extension educators have a lower concern regarding clientele interaction with Extension educators (M= 3.42, SD=1.20), the cost of developing high quality programs that can be delivered at a distance (M= 3.09, SD = 1.17), and that clientele will not accept a distance education method (M=3.00, SD=1.13).

**Table 1.**  
Ranked Mean Scores for Six Statements Dealing with Concerns/Obstacles  
Associated with Distance Education According to Extension Educators

Statement	N	Min	Max	Mean <sup>1</sup>	S.D.
My concern is with connectivity problems from the client's home.	43	2	5	4.14	.83
My concern is that clientele do not have computers/technology to learn at a distance.	43	2	5	3.84	.97
My concern is that clientele do not have the competencies associated with technology to access programs delivered at a distance	43	1	5	3.44	1.10
My concern is lack of clientele interaction with Extension educator	43	1	5	3.42	1.20
My concern is with the cost of developing high quality programs that can be delivered at a distance.	43	1	5	3.09	1.17
I don't think clientele I work with will accept a distance education method.	43	1	5	3.00	1.13
<sup>1</sup> Likert scale defined as: 1= Strongly Disagree, 2= Disagree. 3= No Opinion, 4= Agree, and 5= Strongly Agree.					

## Research Question 2

In evaluating Extension educators' perception of the advantages of distance education, they indicated that saving money and potential expansion of programs are major advantages of distance education. Specifically, Table 2 reveals that savings in travel time ( $M=4.31$ ,  $SD = .52$ ), savings in travel expenses ( $M=4.21$ ,  $SD=.57$ ), program availability to people in different places ( $M=4.07$ ,  $SD = .74$ ), programs' availability to larger, more diverse audiences ( $M=3.93$ ,  $SD= .96$ ), and opportunity for multi-delivery systems ( $M=3.90$ ,  $SD= .73$ ) as perceived advantages. Likert scale was defined as: 1= Strongly Disagree, 2= Disagree, 3= No Opinion, 4= Agree, and 5= Strongly Agree. Table 2 displays all mean values for the remainder of responses.

**Table 2.**  
Ranked Mean Scores for 10 Statements on Advantages to Distance Education  
According to Extension Educators

Statement	N	Min	Max	Mean <sup>1</sup>	S.D.
Savings in travel time.	42	3	5	4.31	.52
Savings in travel expenses.	42	3	5	4.21	.57
Programs available to people in different places.	43	2	5	4.07	.74
Programs available to larger, more diverse audience.	43	2	5	3.93	.96
Distance education strategies provides for a multi-delivery systems.	42	2	5	3.90	.73
It will enable Extension to improve the utilization of specialists in program delivery.	43	2	5	3.88	.76
Distance education strategies enable clientele to learn at their own pace.	41	2	5	3.73	.95
Programs delivered at a distance can strengthen county and multi-county programs	42	2	5	3.62	.88
Programs delivered at a distance are more convenient for audiences.	42	1	5	3.14	1.16
Programs will be more user friendly	42	1	5	2.71	1.04
<sup>1</sup> Likert scale defined as: 1= Strongly Disagree, 2= Disagree, 3= No Opinion, 4= Agree, and 5= Strongly Agree.					

## Research Question 3

Table 3 shows that district-based Extension educators value lawn, ornamental, household gardening ( $M=3.65$ ,  $SD=.80$ ); beginning rancher/new landowner ( $M=3.57$ ,  $SD=.82$ ); continuing education units-pesticide training ( $M=3.55$ ,  $SD=.81$ ); general horticulture ( $M=3.55$ ,  $SD=.77$ ); information on water--urban and rural ( $M= 3.52$ ;  $SD=.76$ ), Master Gardener trainings ( $M=3.48$ ,

SD=.87); and ag/wildlife exemptions(M=3.45, SD=.83) as potential program topics that would be most usable by target audiences. Likert scale was defined as: 1= No Value, 2= Limited Value, 3= Average Value and 4= Much Value.

Table 3 shows moderate levels of value for clientele as perceived by district-based educators for money management (M=3.41, SD=.83), 4-H recordbook training (M=3.41, SD=.88), basic human nutrition (M= 3.36, SD=.95), individual 4-H project training (M=3.35, SD=.84), plant diseases (M=3.33, SD=.88), financial management of farm and ranch (M=3.31, SD= .89), and club manager training (M=3.29, SD= .90). Likert scale was defined as: 1= No Value, 2= Limited Value, 3= Average Value and 4= Much Value.

Lower value topics perceived by respondents were general women's health (M=3.23, SD=.92), health and fitness for adults (M=3.23, SD=1.10), environment stewardship of land (M=3.23, SD= .89), foreign animal disease (M=3.15, SD=.82), mold problems in home (M=3.14, SD=1.10), basic beef cattle management (M=3.12, SD= .89), diabetes education (M=3.09, SD=1.07), Texans Building Character (M= 3.07, SD=.91), youth leadership (M=3.00, SD= .88), parenting (M=3.00, SD= .98), and youth health and fitness (M=3.00, SD= 1.02). Likert scale was defined as: 1= No Value, 2= Limited Value, 3= Average Value and 4= Much Value.

**Table 3.**  
Ranked Mean Scores for the Level of Value these Topics Would Have for Clientele According to Extension Educators

<b>Topic</b>	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean<sup>1</sup></b>	<b>S.D.</b>	<b>Category</b>
Value-Lawn, Ornamental, Household Gardening	31	1	4	3.65	.80	<b>High</b>
Value-Beginning Rancher/New Landowner	30	1	4	3.57	.82	<b>High</b>
Value-CEU's (Pesticide Training)	31	1	4	3.55	.81	<b>High</b>
Value-General Horticulture	31	1	4	3.55	.77	<b>High</b>
Value-Information on Water (urban & rural)	33	1	4	3.52	.76	<b>High</b>
Value-Master Gardener Trainings	29	1	4	3.48	.87	<b>High</b>
Value-Ag/Wildlife Exemptions	29	1	4	3.45	.83	<b>High</b>
Value-Money Management	22	2	4	3.41	.80	<b>Mod.</b>
Value-4-H Recordbook Training	32	1	4	3.41	.88	<b>Mod.</b>
Value-Basic Human Nutrition	22	1	4	3.36	.95	<b>Mod.</b>
Value-Individual Project Training (4-H)	31	1	4	3.35	.84	<b>Mod.</b>
Value-Plant Diseases	30	1	4	3.33	.88	<b>Mod.</b>

Value-Financial Management of Farm & Ranch	29	1	4	3.31	.89	<b>Mod.</b>
Value-Club Manager Training	31	1	4	3.29	.90	<b>Mod.</b>
Value-General Women's Health	22	1	4	3.23	.92	<b>Low</b>
Value-Health & Fitness (Adult)	22	1	4	3.23	1.10	<b>Low</b>
Value-Environment Stewardship of Land	31	1	4	3.23	.89	<b>Low</b>
Value-Foreign Animal Disease	27	1	4	3.15	.82	<b>Low</b>
Value-Mold Problems in Home	22	1	4	3.14	1.10	<b>Low</b>
Value-Basic Beef Cattle Management	26	1	4	3.12	.89	<b>Low</b>
Value-Diabetes Education	22	1	4	3.09	1.07	<b>Low</b>
Value-Texans Building Character	30	1	4	3.07	.91	<b>Low</b>
Value-Youth Leadership	32	1	4	3.00	.88	<b>Low</b>
Value-Parenting	22	1	4	3.00	.98	<b>Low</b>
Value-Health & Fitness (Youth)	22	1	4	3.00	1.02	<b>Low</b>
<b>1</b> Likert scale defined as: 1= No Value, 2= Limited Value, 3= Average Value and 4= Much Value.						

#### Research Question 4

Table 4 reveals that general horticulture (M=3.32, SD=.67), lawn, ornamental, and household gardening (M=3.31, SD=.71); pesticide continuing education units (M=3.26, SD=.86); recordbook training (M=3.26, SD=.68); Master Gardner Training (M=3.19, SD=.96); beginning rancher/new landowner (M=3.11, SD=.80), and information on water (M=3.11, SD=.74) are subject matter topics Extension educators perceive clientele will be most receptive to learning at a distance. Table 4 displays all mean values for the remainder of responses. Likert scale was defined as: 1= Low Likelihood, 2= Some Likelihood, 3= Moderate Likelihood and 4= High Likelihood.

**Table 4.**

Ranked Mean Scores for the Level of Likelihood an Audience Would Be Willing to Learn these Topics at a Distance According to Extension Educators

Topic	N	Min	Max	Mean <sup>1</sup>	S.D.

Likelihood-General Horticulture	28	1	4	3.32	.67
Likelihood-Lawn, Ornamental, Household Gardening	29	1	4	3.31	.71
Likelihood-CEU's (Pesticide Training)	29	1	4	3.26	.86
Likelihood-Recordbook Training	31	1	4	3.26	.68
Likelihood-Master Gardner training	27	1	4	3.19	.96
Likelihood-Beginning Rancher/New Landowner	27	1	4	3.11	.80
Likelihood-Information on Water (Urban & Rural)	28	1	4	3.11	.74
Likelihood-Individual Project Training (4-H)	30	1	4	3.07	.91
Likelihood-Club Manager Training	30	1	4	3.00	.70
Likelihood-Ag/Wildlife Exemptions	26	1	4	2.96	.72
Likelihood-Youth Leadership	31	1	4	2.94	.77
Likelihood-Health & Fitness (Youth)	20	1	4	2.90	.97
Likelihood-Mold Problems in Home	19	1	1	2.89	.88
Likelihood-Health & Fitness (Adult)	19	1	4	2.89	.94
Likelihood-Plant Diseases	28	1	4	2.89	.83
Likelihood-Financial Management of Farm & Ranch	27	1	4	2.89	.80
Likelihood-Texan Building Character	30	1	4	2.87	.73
Likelihood-Basic Human Nutrition	19	1	4	2.84	.96
Likelihood-General Women's Health	19	1	4	2.84	.77
Likelihood-Money Management	20	1	4	2.80	.83
Likelihood-Basic Beef Cattle Management	25	1	4	2.76	.78
Likelihood-Foreign Animal Diseases	23	1	4	2.74	.62



Likelihood-Diabetes Education	19	1	4	2.74	.62
Likelihood-Environmental Stewardship of Land	26	1	4	2.69	.84
Likelihood-Parenting	19	1	4	2.63	.90
<b>1</b> Likert scale defined as: 1= Low Likelihood, 2= Some Likelihood, 3= Moderate Likelihood and 4= High Likelihood.					

In order to gain a better perspective of programs Extension educators suggested would be both likely and valuable to potential audiences, the ranked mean values of both these topics were combined and added together to calculate a combined ranking sum. Table 5 shows that lawn, ornamental, and household gardening; beginning rancher/new landowner; pesticide continuing education training; general horticulture training; information on water (rural and urban); Master Gardening training; and recordbook training rank the highest in terms of value and likelihood.

**Table 5.**  
Comparison of the "Value" Mean Scores of Topics Concerning Distance Education According to Extension Educators

<b>Topic</b>	<b>Value<sup>1</sup></b>	<b>Likelihood<sup>2</sup></b>	<b>Combined Ranking</b>
Lawn, Ornamental, Household Gardening	3.65 (1)	3.31(2)	3
General Horticulture	3.55(4)	3.32(1)	5
CEU's (Pesticide Training)	3.55 (3)	3.26(4)	7
Beginning Rancher/New Landowner	3.57 (2)	3.11(7)	9
Information on Water (Urban & Rural)	3.52(5)	3.11(6)	11
Master Gardener Trainings	3.48(6)	3.19(5)	11
Recordbook Training	3.41(9)	3.26(3)	12
<p><sup>1</sup> Likert scale defined as: 1= <i>No Value</i>, 2= <i>Limited Value</i>, 3= <i>Average Value</i> and 4= <i>Much Value</i>.</p> <p><sup>2</sup> Likert scale defined as: 1= <i>Low Likelihood</i>, 2= <i>Some Likelihood</i>, 3= <i>Moderate Likelihood</i> and 4= <i>High</i></p>			

## Conclusions and Recommendation

The conclusions of the study indicate that Extension educators in one district in Texas perceived the following in regard to distance education.

1. Clientele connectivity is an obstacle in utilizing distance education.

2. Clientele don't have technology to learn at a distance.
3. Clientele have a lack of competencies associated with technology to access programs delivered at a distance.
4. Clientele are reluctant to accept distance education methods.
5. That costs to develop high quality programs to be delivered at a distance are an obstacle.

In addition, Extension educators in the study perceived the following educational topics to have the highest value and that these would be topics that clientele will be most receptive to learning at a distance:

1. Lawn, ornamental, and household gardening.
2. General horticulture.
3. Pesticide continuing education training.
4. Beginning rancher/new landowner.
5. Water education.

These results strongly suggest that Cooperative Extension can in fact develop online educational programs for our traditional and non-traditional clientele. More important, Extension educators appear comfortable with this method of delivery if it matches the appropriate targeted audience and subject matter.

It is important to note that as technology improves and Cooperative Extension clientele adopt these technologies, we continue to train and communicate clearly to Extension educators best practices associated with program delivery utilizing technology. Our educational impact will be maximized if programs are delivered to clientele using technologies embraced by Extension educators.

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