An Educational Evaluation of Web-Based Forestry Education

Shorna Broussard Allred
Associate Professor
Human Dimensions Research Unit
srb237@cornell.edu

Peter J. Smallidge
NYS Extension Forester
Director, Arnot Teaching and Research Forest
Director, Cornell Maple Program
pjs23@cornell.edu

Department of Natural Resources
Cornell University
Ithaca, New York

Abstract: Online forestry education can serve large populations of woodland owners and managers. Cornell University's ForestConnect program initiated the nation's first woodlot management educational webinar series. We conducted an educational evaluation to determine: (1) the educational impact of the ForestConnect Webinar series, (2) the involvement of new audience members, (3) the advantages and disadvantages of distance learning in natural resources education, and (4) the kinds of online resources and digital technology registrants use. Results from a web survey (N=1,099) show that most webinars reach new audience members and that participants seek additional information as a result of viewing the webinar.

Introduction

Online education can serve Extension audiences and deliver educational programming in new, innovative, and efficient ways. However, little is known about the efficacy of such educational methods, particularly in natural resources education. Advantages of webcast education are real-time communication between audience and speaker, low cost of infrastructure, geographically unlimited audience reach, and ability to archive webcasts for retrospective use.

This has implications for all Extension professionals because the technology associated with the Internet is constantly evolving and the widespread availability of broadband connections has led to an increase in live Internet broadcasting, or webcasting (Munteanu, Baecker, Penn, Tomms, & James, 2006). As with the initial emergence of other technologies (telephone, television, etc.), Internet usage is highest among the most educated and affluent. However, Internet usage does penetrate deeply into American society, with 119 million households (69%) having Internet use at home (U.S. Census Bureau, 2009). This figure is rising quickly. It was only 42% in 2000 (U.S. Census Bureau, 2009). Additionally, 79% of adults in the U.S. report

using the Internet at a workplace, school, home, or other location on at least an occasional basis (Rainie, 2010).

Web conferencing technology can be used to reach woodland owners and other Extension audiences with educational opportunities. In 2007, interactive webinars targeted at woodland owners and forestry practitioners were implemented for the first time in the United States by Cornell University's New York State Forestry Extension program. The study reported here provides results from an evaluation of the effectiveness of this educational medium. We begin by providing an overview of studies focusing on distance learning in natural resources education. While this research is focused on forestry education, the use of webinars as an educational medium has relevance and applicability to Extension professionals from other disciplines as well.

Distance Learning in Natural Resource Education

While in-person natural resource educational programs are a valued and effective mode of education (Jones, Goheen, Dhuyvetter, Kastens, & Boadu, 2007), distance education via online programs can also be an effective mode of learning and has added benefits of being both cost-effective and convenient (Lippert, Plank, Camberator, & Chastain, 1998; Lippert & Plank, 1999; Lippert, Plank, & Radhakrishna, 2000; Jones, Goheen, Dhuyvetter, Kastens, & Amanor-Boadu, 2007; McCann, 2007). Online information has the potential to reach large populations of forestry professionals and woodland owners, which has led to forestry information increasingly being offered online (Bardon, 2003; Jackson, Hopper, & Clatterbuck, 2004; Jianbing, Michael, Smith, Ashton, Biles, Cassidy, & Foster, 2008). A recent national survey found that nearly 25% of woodland owners prefer to get forest management information via the Internet (Butler, Miles, & Hansen, 2009).

Distance learning via the Internet presents many educational opportunities as well as challenges. Distance learning programs that offer interactive, media-rich learning environments are more educationally effective than programs lacking those elements (McCann, 2007). Advantages of Web-based natural resource distance education are (in approximate decreasing order of importance): flexible instructional hours, not having to travel, cost-effectiveness, the ability to share ideas with others not from the participants' geographic area, access to current information, and post-module access to materials on Web pages (Lippert et al., 1998; Lippert et al.,1999; Lippert et al., 2000). Disadvantages of Web-based distance education are (in approximate decreasing order of importance): inability to interact face-to-face with instructors and peers, diminished likelihood of asking a question online, distractions in immediate vicinity, Internet access problems, lack of time to participate, inability to see hands-on demonstration, and the negative impact the Internet has on how questions were handled (Lippert et al., 1998; Lippert et al.,1999; Lippert et al., 2000).

ForestConnect Forestry Webinars

In May 2007, New York's ForestConnect program launched the nation's first monthly webinar series on woodlot management for owners, managers, and practitioners. There are two types of ways to view the 1-hour webinars; they are offered twice on the same day as a live, interactive presentation (noon and 7:00pm), and the presentations are recorded and archived online for viewing at anytime. During webinars, only the host and speaker have audio capacity. Participants interact via typing questions into a "chat pod" that allows all users to see the question and for the speaker to respond immediately or delay a response until an opportune time.

The ForestConnect program utilizes the Internet accessibility of the participants for use in webinar marketing and program evaluation. All marketing has relied on distribution of monthly press releases through internal and partner electronic mailing lists. Prospective participants are required to register, once, with their name, state, email address, and ownership or management characteristics, to receive notification of the monthly

webinar connection details.

Methodology

An educational evaluation was designed to assess ForestConnect webinars. The sample for the survey was comprised of ForestConnect program registrants who requested to be added to the listserve between April 1, 2003 and February 5, 2009. All listserve registrants had expressed interest in receiving communication about monthly webinars, but not all registrants had attended webinars. Only those individuals with complete e-mail or e-mail and postal addresses were included in the sample (N=1,099). The sample primarily consisted of people from the U.S., but 11 registrants were in non-U.S. locations. A Web survey instrument (10 pages, 39 questions) was developed that contained both questions that have been validated in previous research (Jones et al., 2007; McCann, 2007; Lippert et al.,1998; Lippert et al., 1999; Lippert et al.,2000) as well as new question items.

To answer the research and evaluation questions listed below, some survey questions were specific to the ForestConnect webinars, while others were about distance learning generally because not all sample members had viewed or participated in a webinar. The survey data collection procedure was as follows. A total of 6 e-mails were sent to each listserve registrant: an advance notification e-mail, an invitation e-mail with the survey URL, and four reminder e-mails with survey URL. The overall response rate was 46.0% (n=503). We used Response Rate 6 to calculate the response rate in the study (RR6=(I + P)/(I+P)+(R+NC+O, where I=Complete interview, P=Partial interview, R=Refusal, NC=Non-contact, O=Other non-contact) (American Association for Public Opinion Research, 2008).

Research and Evaluation Questions

1. What are the demographic characteristics of the population of woodland owners and managers the ForestConnect webinar series is reaching? How many ForestConnect listserve registrants participate in webinars?

2. Does participation in the ForestConnect webinar series encourage people to seek additional educational opportunities and to adopt positive conservation behaviors?

3. How does the nature of participation (live, recorded, interactive, readings, etc.) influence educational effectiveness? How can educational effectiveness be enhanced?

4. What kinds of online and social networking resources do ForestConnect registrants use?

5. How does distance learning through webinars compare to other types of forestry education?

6. What are the advantages and disadvantages of distance learning in natural resources education?

Results

Results are presented first in terms of demographic and other characteristics for all survey respondents to gauge the characteristics of those interested in receiving information about online distance educational in forestry. Then results are presented specifically for those people who have actually participated in forestry webinars and for the subsample of webinar participants that were also woodland owners.

Characteristics of Respondents and Participants

Characteristics of All Respondents

Results show that 64.0% of survey respondents were woodland owners, 16.2% managed forestland for others, and 19.8% neither managed nor owned woodland. Most respondents were males (73.0%) (Table 1). Many were employed full or part-time (76.2%), while 21.9% were either fully or partially retired, 1.3% were stay-at-home parents, and 0.6% were unemployed. When asked about their place of residence, respondents indicated that they live in rural areas (59.0%), suburban areas (27.3%), or urban areas (13.2%). For educational attainment, most were highly educated (Table 1, column 5). Over half (55.7%) indicated that they have membership in a non-profit organization (for example, Sierra Club, Audubon, etc.), 28.1% in their state woodland or forest owner association, 26.2% in the American Tree Farm System, and 25.2% in the New York Forest Owners Association. Additionally, 18.4% were trained master woodland/forest owner volunteers, and 18.7% were members of a regional woodland or forest owner association.

Table 1.
Demographic Characteristics for three Sub-Samples of the Survey (columns 3-5) as Compared to New York Woodland Owners (column 2) and U.S. Woodland Owners (column 1)

	1 National Woodland Owner Survey (NWOS) U.S. Data Only (N=10,192,000) (in thousands) % (n)	2 National Woodland Owner Survey (NWOS) NY Data Only (in thousands) (N=614,000) % (n)	3 Webinar Participants that are also Woodland Owners (N=301) % (n)	4 All Webinar Participants (N=245) % (n)	5 All Respondents (N=522) % (n)
Gender					
Male	80.98% (6,990)	85.69% (449)	80.17% (194)	74.74% (284)	72.94% (345)
Female	19.02% (1,642)	14.31% (75)	19.83% (48)	25.26% (96)	27.06% (128)
Age (NWOS categories in parentheses)					
19 years of age or less (<35 NWOS)	-	-	0% (0)	0% (0)	0% (0)
	2.34% (229)	0% (0)	3.29% (8)	13.12% (50)	12.66% (60)

20-35 years *(35-44 NWOS)*				
36-50 years *(45-64 NWOS)*	9.16% (898)	10.64% (65)	27.16% (66)	27.82% (106)	28.06 (133)
51-65 years *(54-65 NWOS)*	22.17% (2,173)	22.26% (136)	47.74% (116)	42.78% (163)	42.41% (201)
65+ years *(65-74 NWOS)*	32.17% (3,154)	23.24% (142)	21.81% (53)	16.27% (62)	16.88% (80)
75 + years (NWOS only)	15.07% (1,477)	23.57% (144)	-	-	-
Education					
Less than High School	10.69% (1,034)	7.93% (47)	0% (0)	0% (0)	0% (0)
High School/GED	26.98% (2,610)	23.78% (141)	0.82% (2)	.079% (3)	1.05% (5)
Some College	19.98% (1,933)	15.85% (94)	11.84% (29)	8.64% (33)	8.63% (41)
Vocational/Technical School (not on NWOS)	-	-	1.63% (4)	1.05% (4)	1.68% (8)
Associates Degree	11.55% (1,117)	12.98% (77)	7.76% (19)	6.81% (26)	6.95% (33)
Bachelor's Degree	16.03% (1,551)	18.21% (108)	37.96% (93)	38.74% (148)	37.68% (179)
Graduate/Professional Degree	14.78% (1,430)	21.25% (126)	40.00% (98)	43.98% (168)	44.00% (209)

Characteristics of All Webinar Participants

A large majority of ForestConnect listserve registrants participated in forestry webinars (79.2%, n=414). Common reasons reported for non-participation were no convenient time (62%, n=67), no topics of interest (15.7%, n=17), slow computer connection (13.0%, n=14), not interested in Web-based learning (5.6%, n=6), and don't know how to unsubscribe from listserve (4.6%, n=5). Most participants viewed a combination of live and recorded webinars (47.9%, n=196), while some viewed only live webinars (38.1%, n=156) or only recorded ones (13.9%, n=57). Webinar participants collectively own 2.29 million acres of woodland. Also, for one in 10 woodland owners participating in ForestConnect webinars (14.3%), this was their first forestry educational experienceâ in-person or otherwise.

For those who had participated in a live webinar or viewed an archived recording, most (82%) had viewed between one and six webinars (Figure 1). Some participants viewed webinars in groups (15.7%, n=65), usually in an Extension office. Those viewing webinars in groups were asked to what extent they agreed that group interaction enhanced learning: 18.8% strongly agreed, 65.6% agreed, 10.9% were neutral, 1.6% disagreed, and 1.6% strongly disagreed. To gauge the level of attention given to the webinars, we asked to what extent participants "multi-tasked" while viewing the webinars (Table 2). Many participants consumed food during webinars and answered phone calls or e-mails. However, few reported surfing the Internet or chatting via instant messenger. Of note is that a third of webinar participants looked up information related to

the webinar topic (Table 2).

Figure 1.
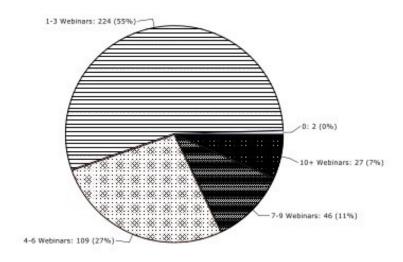Number and Percent of Forest Connect Webinars Attended by Survey Respondents

Table 2.
Level of Attentiveness During Webinar Viewing

While viewing the webinar, I often have:	Yes % (n)	No % (n)
Consumed food	59.7 (231)	4.03 (156)
Looked up information on the web related to the webinar topic	33.3 (115)	66.7 (230)
Answered my telephone	30.6 (104)	69.4 (236)
Checked e-mail	24.4 (85)	75.6 (263)
Got up and left my computer for part of the webinar	20.3 (68)	79.7 (267)
Sent or received instant messages	8.1 (27)	91.9 (305)
Surfed the Internet	6.5 (21)	93.5 (304)

Interaction during live webinars is hypothesized to enhance the educational effectiveness. Participants interacted with speakers and the other webinar participants by asking a question of the speaker (45.2%), posting a comment to the group (34.6%), or sharing a weblink with the group (7.3%) (Table 3). For those who interacted, 69.6% indicated that it enhanced their learning experience, 26.3% stated that it enhanced learning a little, and 4.1% said it did not really enhance learning. Most were satisfied with the presenter

interaction; 19.4% strongly agreed that they were satisfied, 61.9% agreed, 16.2% were neutral, 1.8% disagreed, and 0.8% strongly disagreed. Background readings were provided in 19 of the last 24 webinars (79%) as a PDF link posted at the schedule of webinars. While 22.4% did not read the provided materials, 77.2% did read the materials and also indicated that the readings aided in their learning. (Only 0.4% told us that the readings did not enhance learning.)

Table 3.
Types of Interaction During Forest Connect Webinars

What types of interaction do you typically take part in during the live ForestConnect webinars?	Yes % (n)	No % (n)
Asked a question of the speaker by typing into the chat pod	45.2 (171)	54.8 (207)
Posted a comment about the webinar topic in the chat pod	34.6 (121)	65.4 (229)
Posted a link or other potentially useful information in the chat pod	7.3 (23)	92.7 (294)
Did not interact	38.3 (153)	61.8 (247)

Characteristics of Woodland Owner Webinar Participants

Data from a sub-sample of woodland owning respondents were analyzed to determine how webinar participants differ, if at all, from the general population of woodland owners, both in the United States and New York specifically. For comparative purposes, we used secondary data from the National Woodland Owner Survey (NWOS) (Table 1, columns 1 and 2) (Butler et al. 2009). Column 1 includes summary statistics for U.S. Woodland owners, and column 2 shows data for New York woodland owners. From the survey data we collected, we have all respondents (column 5), only respondents who participated in webinars (column 4), and only woodland owners who participated in webinars (column 4).

Because National Woodland Owner Survey data are only available in summary format, we were unable to determine statistically significant differences. However, descriptive statics reveal interesting trends regarding participation in forestry webinars. The data show that female woodland owners participated in forestry webinars (20%) in numbers that exceed their proportions in both New York (14%) and the U.S. woodland owner populations. For age, webinars seemed to attract younger woodland owners, but direct comparisons are difficult because the age question on our survey did not exactly match the NWOS age categories. Participants in webinars were very highly educated, more so than the average woodland owner both nationally and within New York (Table 1). A large majority (78%) of woodland owner webinar participants reported having a B.S. degree or higher, compared to 39% of woodland owners statewide with Bachelor's degrees and 31% nationally.
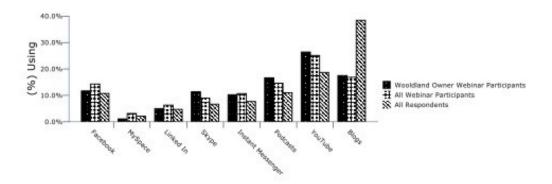
Use of On-line and Social Networking Tools

To gauge the use of online and social networking tools, we asked respondents to indicate whether they currently use Facebook, MySpace, Linked In, Skype, Instant Messenger, Podcasts, YouTube, or blogs. For woodland owners who participated in webinars, all webinar participants and all respondents, approximately 59.0% reported using at least one of these online resources. For woodland owners who participated in

webinars, You Tube, blogs, and podcasts were the most commonly used online resources (Figure 2). These were the top three among all webinar participants as well. For the entire sample of respondents, blogs were the most commonly used online resource (Figure 2).

Figure 2.
Use of social Networking and Other Online Tools by Woodland Owner Webinar Participants, All Webinar Participants, and All Respondents

Evaluation of ForestConnect Webinars

Forest Connect webinar viewers were asked to assess the webinars on a set of 26 parameters (Table 4). Respondents expressed a high level of satisfaction with webinar content, pace, and level at which information was presented. They were also satisfied with the educational value of webinars as a method of learning. Items to which respondents expressed neutral to near agreement opinions were with the level of interaction with presenters (mean=3.97) and benefiting from interaction (mean=3.86) (Table 4). Additionally, webinars didn't seem to address all of the questions that participants had about a topic. Last, respondents did not feel strongly that seeing the presenter would have added value to the webinar. Most were comfortable with the once monthly webinar schedule and would likely not view the webinars in a group. When asked if the webinar was above their level of understanding, most disagreed with that statement.

Table 4.
Respondent Evaluation of Various Aspects of Forest Connect Webinars

	n	Mean*
The webinar was an effective method of learning about the topic.	398	4.42
I was comfortable learning using the webinar format.	397	4.40
I was satisfied with the quality of the presentation.	396	4.35
The content was easy to understand.	399	4.35
The content was relevant	396	4.33
The information was presented at an understandable level.	398	4.35
I found the training to be valuable.	398	4.30

The webinar made learning easy.	397	4.25
I am likely to apply what I learned as a result of this training.	398	4.19
Webinars effectively increase my knowledge and understanding of topics and related issues.	392	4.21
Webinars effectively raise my awareness or consciousness about topics and related issues.	392	4.19
The pace of the presentation was good.	398	4.18
The content was effectively organized.	389	4.14
The content was presented in an interesting manner.	391	4.13
I was satisfied with my level of interaction with the presenters.	396	3.97
The amount of time given to the webinar was adequate.	393	3.84
I benefited from the interaction of other participants with the presenters	394	3.86
I have recommended a ForestConnect webinar to someone else.	390	3.87
The session addressed all of my questions relative to the subject matter.	393	3.45
I use the recordings of a webinar I saw live to remind me of important or interesting concepts.	388	3.15
I would like more interaction with other participants.	392	2.96
I like the webinars because of the continuing education credits.	391	2.95
Being able to see the presenter would have added value to the webinar.	391	2.96
I would like to participate in more than one forestry-related webinar per month.	390	2.95
I would like to view the webinar at a local site if a group activity about the topic was coordinated by a facilitator.	392	2.91
The content of the webinar was above my level of understanding.	393	1.89
*Scale answer categories were: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree.		

Actions as a Result of Webinar

We asked respondents what actions they took as a result of the webinar; 70.9% (n=287) sought out more information on the webinar topic as a result of participating in a ForestConnect webinar. Nearly all agreed that they were likely to apply what they learned as a result of the training. (89.2% agreed or strongly agreed with that statement.) Examples from open-ended survey responses of how they applied what they learned from the webinar include the following.

"Looked up information including peer reviewed articles and websites to get more information on the topic"

"I have spoken with a forester, and done additional reading in forestry related publications. In recent work on the land, I have benefited from insights gained from the seminars."

"Surveyed trees in my backwoods and tried to identify kinds of tree species that I have. Did research on best practices in managing woodlots to conserve biodiversity."

"Discovered a grove of Ailanthus (Tree of Heaven) on our property and consulted with our local extension Forester about control. Implemented Merit applications for wooly adelgid on Hemlocks."

"Applied practices on my woods. For example, roundup on stumps to control Beech."

We asked respondents to indicate what other types of other educational programs they use (Table 5). The most commonly used sources of educational information were reading information from the Internet, reading books, conversations with natural resource professionals, magazine or journal subscriptions, and attending educational workshops. Webinar participants used a variety of learning tools that included both individual access through reading and group learning through woodswalks and similar networks.

Table 5.
Additional Forms of Education used by Respondents

In addition to webinars, I educate myself about natural resources through:	**Yes % (n)**	**No % (n)**
Visit to the property of other owners as a woodswalk	71.3 (338)	28.7 (136)
Participation in a forest owner association local events	53.9 (253)	46.1 (216)
Reading books	92.3 (441)	7.7 (37)
Subscribing to magazines or journals	84.5 (403)	15.5 (74)
Reading information from the Internet	97.3 (464)	2.7 (13)
Conversations with natural resource professionals	91.0 (434)	9.0 (43)
Attending professional society meetings	49.6 (233)	50.4 (237)
Talking with other forest owners	80.1 (379)	19.9 (94)
Attending educational workshop	82.4 (393)	17.6 (84)
Trying different activities in the woods and monitoring the outcome	71.9 (341)	28.1 (133)

Respondent Ratings of Advantages and Disadvantages of Webinars in General

While most respondents believed that webinars would not make in-person educational events unnecessary, many enjoyed the advantages of webinars, such as not having to travel, being able to access recorded webinars, access to current information, and ease of fitting into schedule (Table 6). The mean ratings for disadvantages were all below 3.0 on the scale (neutral), meaning respondents did not have strong endorsements of any of the disadvantages (Table 7).

Table 6.
Respondent Ratings of Advantages of Webinars

Advantages of Webinars	n	Mean*
Does not involve travelling	486	4.59
Access to the recorded webinar if you missed original presentation	485	4.43
Access to current information	479	4.35
Easier to fit into schedule than in-person seminars	486	4.35
Post-webinar access to website for additional information	485	4.20
Ability to interact with people from different regions	478	3.95
Ability to interact with the instructor on-line	482	3.90
More comfortable to learn at home or office via the Internet than in-person events	483	3.60
Provides easy and inexpensive access to Continuing Education Credits	481	3.60
Internet learning is more efficient use of time than in-person training	482	3.52
Internet learning will make in-person educational events unnecessary	482	2.00
*Scale answer categories were: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree.		

Table 7.
Respondent Rating of Disadvantages of Webinars

Disadvantages of Webinars	n	Mean*
Web-based medium restricts in-depth communication	480	2.93
Lack of personal contact with other participants	481	2.84
Lack of personal contact with the webinar speaker	481	2.73
Internet access or other technical problems	480	2.67
Lack of time to view the webinar	480	2.57
I am not likely to ask a questions on-line via the chat pod	482	2.54
The webinar format doesn't allow for adequate asking or responses to questions	478	2.42
I am distracted when I try to observe the webinar	479	2.35
*Scale answer categories were: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree.		

The advantages of webinars related to the enhanced opportunity for participants to acquire information at a time and place that is convenient to their schedule. Similar advantages existed for the host and speaker, who can avoid the costs and risks of travel and who can easily and inexpensively provide access to electronic resources to the audience. Webinars allowed access to speakers whose job might not typically allow time for travel, but who can take advantage of technology to bridge geographic barriers.

The primary reported disadvantage of webinars related to a lack of interactivity with the speaker and other participants (Table 7). While nearly half of webinar viewers (45%, Table 3) indicated that they asked a question during a webinar, it is still an on-line interaction. Also, note that a respondent who participated in several webinars may have only asked a question one time. In a typical webinar with 100 participants, 15 to 30 will ask one or more questions.

Conclusions and Recommendations

Webinars provide a valuable tool that can be effectively and efficiently used to reach Extension stakeholders and facilitate the collection of program evaluation data. Speakers and participants gain by having broad geographic interaction, without the costs associated with travel.

Respondents indicated that webinars make access to learning easier and connect new audience members to educational resources. This technology may be a bridging tool that will encourage people who have not sought assistance to have more confidence in and familiarity with helpful organizations. The greater representation of women, young, and well-educated woodland owners suggests this is an effective tool for these audience sectors. It is unclear how well these audiences are represented in traditional educational venues. Continuing education credits are increasingly valued by participants.

However, some audience sectors were not well represented in our respondents. Notably under-represented were woodland owners with less than a bachelor's degree. It is unclear if these under-represented groups lacked awareness of the webinars, did not have the ability to access the webinars, or just were not interested. Marketing specifically to these under-represented groups may encourage their participation. Some of these potential users may need educational assistance to become comfortable with the technology.

Effective use of webinars as a teaching tool requires a dedicated marketing effort, explicit training with presenters, more consistent and proactive dispersal of supplemental reading, and familiarity with other Web resources to share. We typically allocate between 1.5 and 3 hours of one-on-one training with novice presenters to give us all confidence that the webinar will run smoothly. The computer systems of some partners have challenged the compatibility of our system and thus rewarded our efforts at advance planning.

Prospective webinar hosts should plan ahead to make effective use of the Internet to monitor program outcomes and program impacts. The mandatory registration that we require has not been identified as a barrier to participation. We use the registration database to advertise the monthly webinars and also to encourage webinar participants to complete a simple and consistent web-based survey at the close of each webinar. We use the exit survey to allow prompt feedback to presenters and reporting of outcomes to sponsors and administrators.

Despite the success with webinars, there are underused opportunities. First, the database of prospective participants provides a link to a known audience that might be more effectively accessed to distribute information and solicit input on program development. This audience should be tactfully engaged because their expectation is only for monthly interaction. Second, the archives of webinars provide a resource that could more effectively be used by hosts and partners. Archives could be used to fill a gap at a workshop or for in-service training. Finally, the land-grant universities who currently host webinars seem to effectively

share and distribute announcements for webinars. Most have a monthly pattern of offerings and typically have avoided conflicts with timing. Some participants have struggled to understand the differences in Web conferencing software and processes used by these different institutions. However, these struggles are minimal and likely to decline through time.

Acknowledgements

References

The American Association for Public Opinion Research. (2008). *Standard definitions: Final dispositions of case codes and outcome rates for surveys*. 5th edition. Lenexa, Kansas: AAPOR.

Bardon, R. (2003). Providing knowledge at the click of a mouse: forestry and natural resources desktop reference library. *Journal of Extension* [On-line], 41(3) Article 3TOT2. Available at: http://www.joe.org/joe/2003june/tt2.php

Butler, B. J., Miles, P. D., & Hansen, M. H. (2009). National Woodland Owner Survey Tabler web-application version 1.0. Amherst, MA: U.S. Department of Agriculture, Forest Service, Northern Research Station. Available only on Internet. Retrieved Sept. 16, 2009 from: http://fiatools.fs.fed.us/NWOS/tablemaker.jsp

Jackson, S., Hopper, G., & W. Clatterbuck. (2004). Developing a national Web-based learning center for natural resource education. *Journal of Extension* [On-line], 42(1) Article 1IAW1. Available at: http://www.joe.org/joe/2004february/iw1.php

Jianbang, G., Michael, R., Smith, C., Ashton, S., Biles, L., Cassidy, D., Foster, D. et al. (2008). The southern US bioenergy encyclopedia: Making scientific knowledge more accessible. *Southern Journal of Applied Forestry*. 32(1): 28-32.

Jones, R., Goheen, A., Dhuyvetter, K., Kastens, T., & Amanor-Boadu, V. (2007). Using distance education in Extension programming. *Journal of Agriculture and Applied Economics* 39(2): 265-274.

Lippert, R., Plank, O., Camberato, J. & Chastain, J. (1998). Regional Extension in-service training via the Internet. *Journal of Extension* [On-line], 36(1) Article 1FEA3. Available at: http://www.joe.org/joe/1998february/a3.php

Lippert, R., & Plank, O. (1999). Responses to a first time use of Internet inservice training by agricultural Extension agents. *Journal of Natural Resources and Life Sciences Education* 28: 53-56.

Lippert R., Plank, O., & Radhakrishna, R. (2000). Beyond perception: A pretest and posttest evaluation of a regional Internet Extension in-service training. *Journal of Extension* [On-line], 38(2) Article 2FEA2. Available at: http://www.joe.org/joe/2000april/a2.php

McCann, B. (2007). The effectiveness of Extension in-service training by distance: Perception versus reality. *Journal of Extension* [On-line], 45(1), Article 1FEA4. Available at: http://www.joe.org/joe/2007february/a4.php

Munteanu, C., Baecker, R., Penn, G., Toms, E. & James, D. (2006). The effect of speech recognition accuracy rates on the usefulness and usability of webcast archives, Proceedings of the SIGCHI (Special Interest Group on Computer-Human Interaction) conference on Human Factors in computing systems, April 22-27, 2006, Montréal, Québec, Canada.

Rainie, L. (2010). Internet, broadband, and cell phone statistics. Pew Internet and American Life Project, Pew Research Center, Washington, DC.

U.S. Census Bureau. 2009. Current Population Survey. Appendix Table A, Households With a Computer and Internet Use: 1984 to 2009. U.S. Census Bureau: Washington, DC. Retrieved Sept. 16, 2009 from: http://www.census.gov/population/www/socdemo/computer/2009.html

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